KUNDENDIENST

ITT Graetz

S E R V I C E

MANUAL

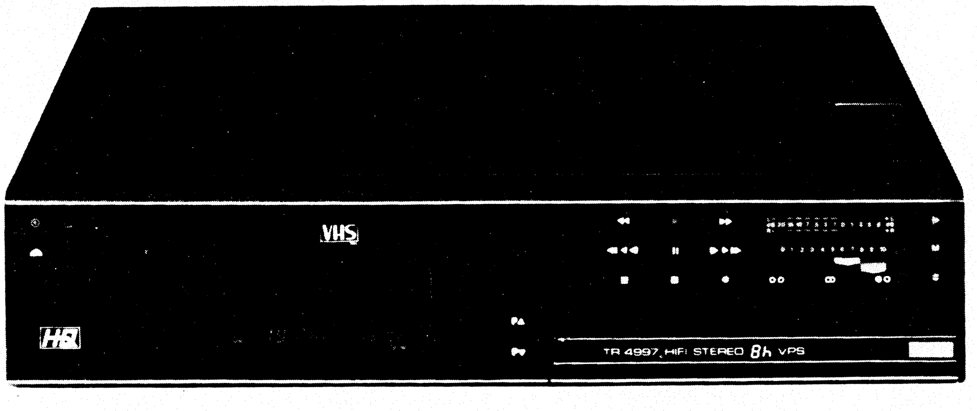
Schaltbilder – Lagepläne

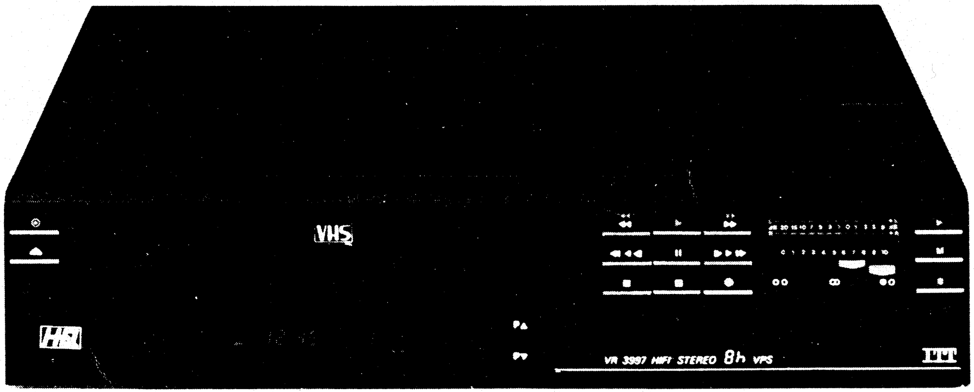
Schematic Diagrams – Circuit Boards

Teil 1 / Part 1

VR
133-1
1986

VIDEORECORDER 3997 Hifi Oscar VPS
TELERECORDER 4997 Hifi Oscar VPS





Dieses Manual gilt in Verbindung mit folgenden Manualen:

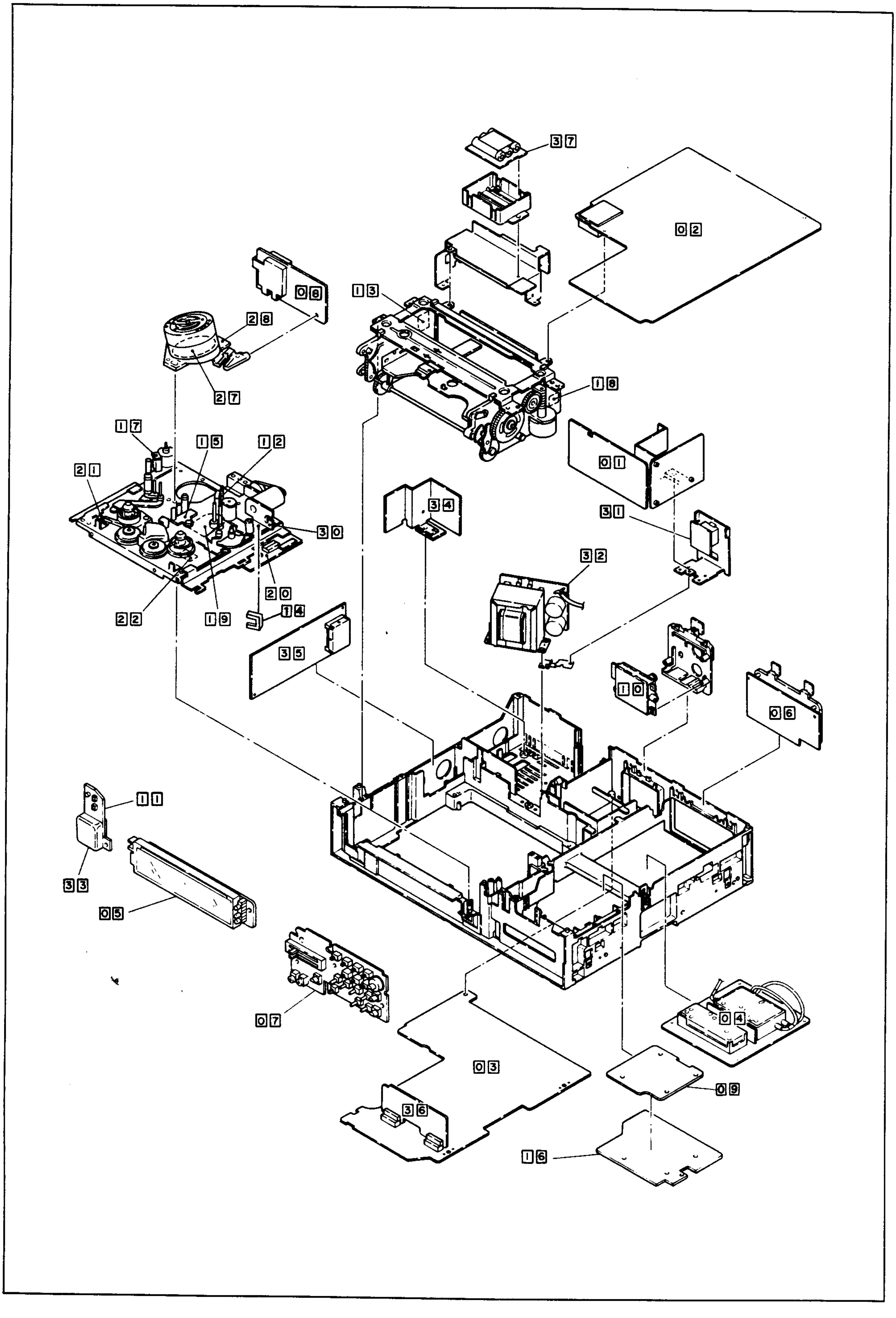
VR 133-1	Schaltbilder – Lagepläne Bestell-Nr. 6611 81 80
VR 133-2 + 3	Einstellanweisung der Mechanik und Elektronik Ersatzteile-Listen Bestell-Nr. 6611 81 81

This manual is to be used in conjunction with the following Service Manuals:

VR 133-1	Schematic Diagrams – Circuit Boards Part. No. 6611 81 80
VR 133-2 + 3	Mechanical and Electronic Adjustments Spare Parts Lists Part. No. 6611 81 81

Bei Reparaturen gültige Sicherheitsvorschriften beachten!

Baugruppen-Lageplan
Circuit Boards Location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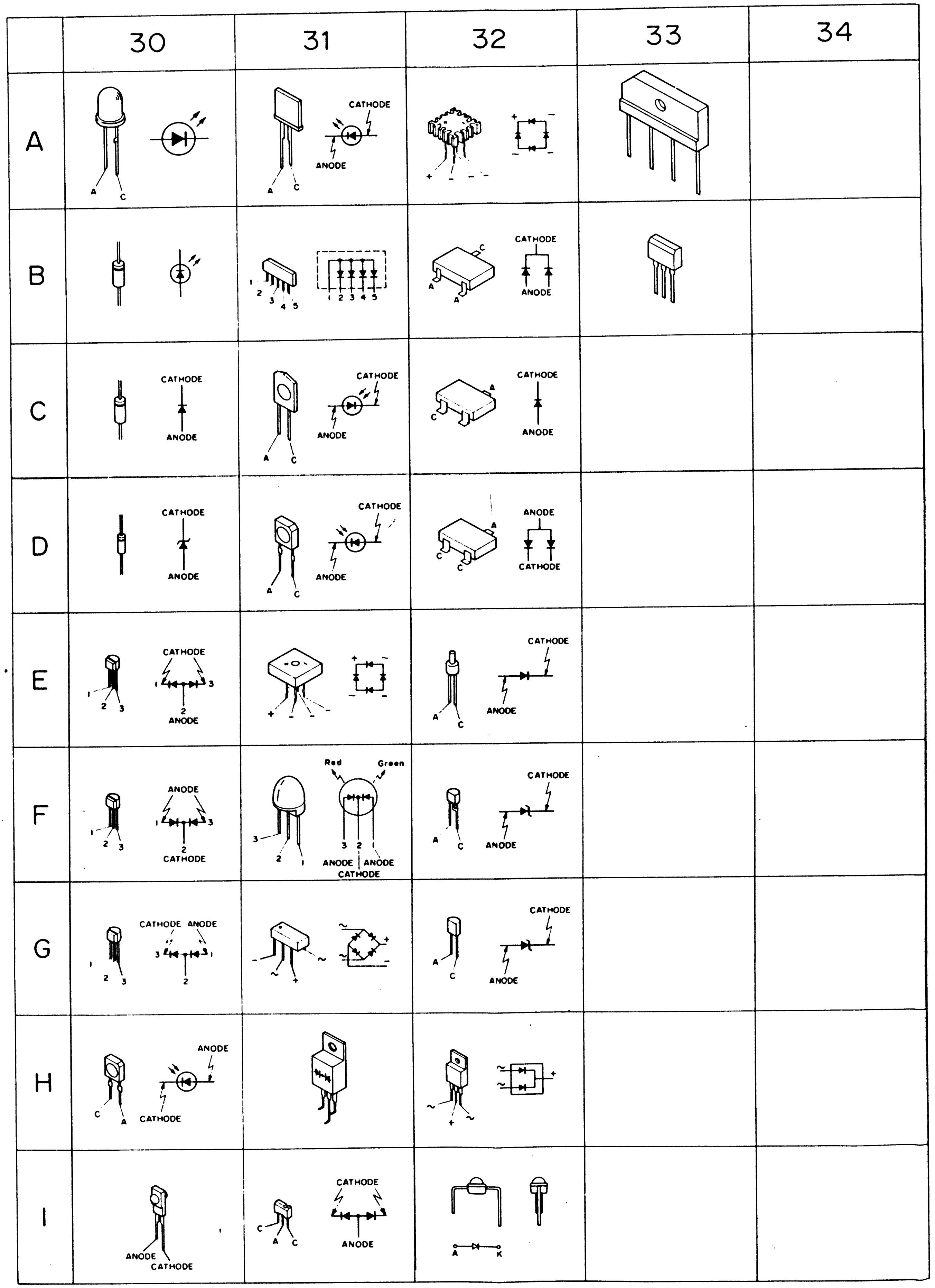
Technische Daten:

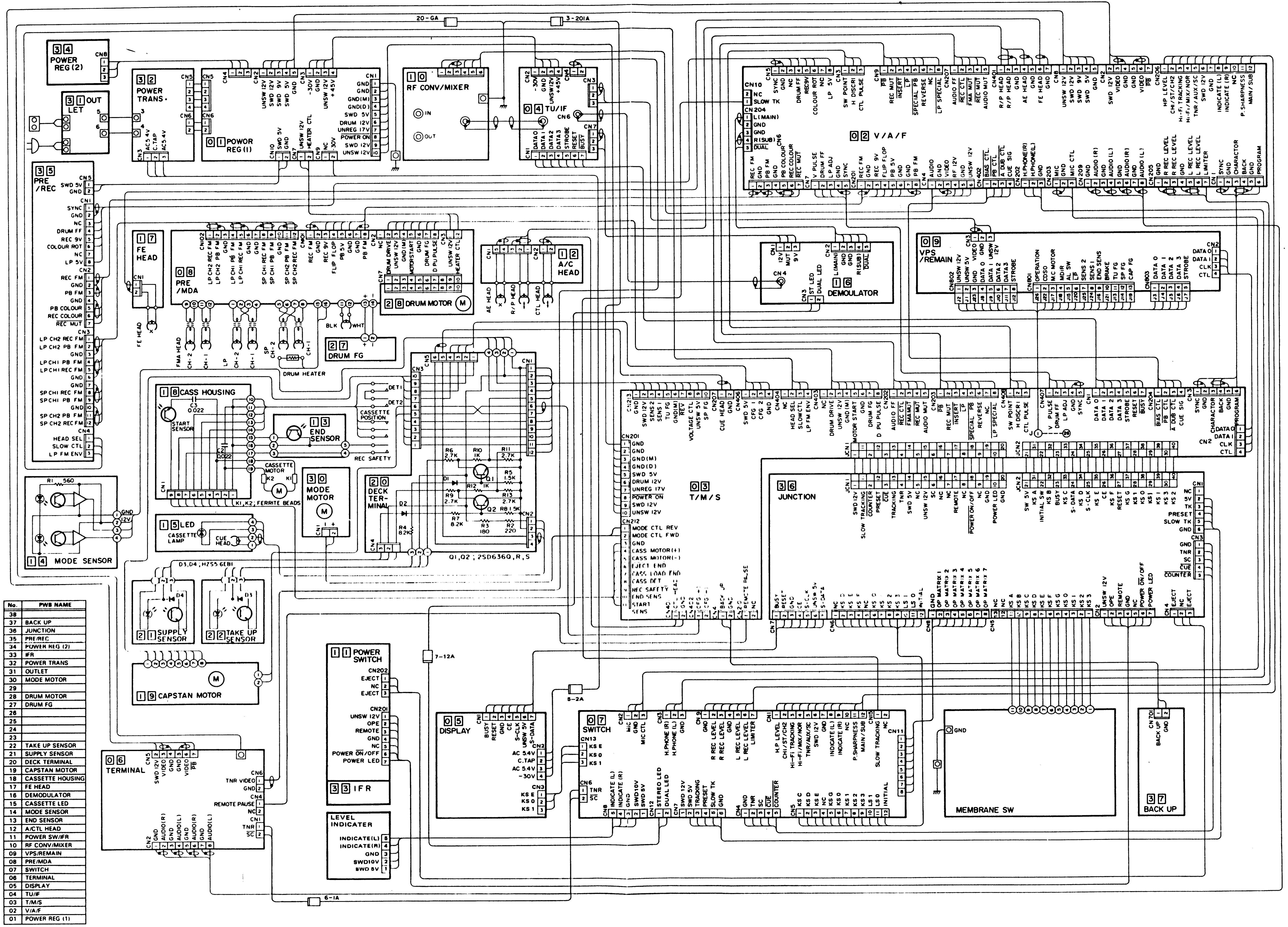
Systemdaten	
Format:	VHS-Pal-Standard mit Hi-Fi-Ton
Video-Aufzeichnungssystem	Rotierendes Zweikopf-Schrägspur-Aufzeichnungssystem mit einer Zweier-Videokopfspalt-Kombination.
Hifi-Tonaufzeichnungsverfahren:	Band-Tiefenmodulations-Aufzeichnungsverfahren entsprechend dem Stereo-Hifi-VHS-Standard
Anzahl der Tonspuren:	2 Hifi-Tonspuren 1 Standard-Tonspur
Fernsehnorm:	CCIR-625 Zeilen-Pal
Bandbreite:	12,65 mm
Bandgeschwindigkeit: (SP):	23,39 mm/sec.
(LP):	11,70 mm/sec.
Aufzeichnungsdauer: (SP):	max. 4 Std. mit einer E-240er Cassette
(LP):	max. 8 Std. mit einer E-240er Cassette
Anschlußdaten	
Netzanschluß:	220 V, 50/60 Hz
Leistungsaufnahme:	40 Watt
Video	
Eingang:	0,5 V_{ss} ... 2,0 V_{ss}, 75 Ohm unsymmetrisch
Ausgang:	1,0 V_{ss}/ 75 Ohm unsymmetrisch
Signal/Rauschverhältnis:	43 dB (Bildschärfe-Einsteller in Mittelstellung)
Auflösung (horizontal):	250 Zeilen (Bildschärfe-Einsteller in Mittelstellung)
Audio	
Eingang: Chinch-Buchse:	–20 dBs, 50 kOhm, unsymmetrisch
Scart-Buchse:	–3,8 dBs, 10 kOhm, unsymmetrisch
Ausgang: Chinch-Buchse:	–6 dBs, große Impedanz
Scart-Buchse:	–3,8 dBs, große Impedanz
Ausgangsimpedanz:	≦ 1 KOhm, unsymmetrisch
Signal/Rauschverhältnis:	≧ 40 dB
Frequenzbereich:	70–10000 Hz
Hifi-Audio	
Frequenzbereich:	20–20000 Hz
Dynamik-Umfang:	≧ 80 dB
Gleichlaufschwankung:	≦ 0,005% WRMS
TV-Tuner/HF-Teil	
Kanal-Speicherkapazität:	32 Kanäle
Antenneneingang:	VHF-Band 47–89 MHz, 104–300 MHz, 302–470 MHz UHF-Band IV, V 470–862 MHz
Antennen-Ausgang:	UHF-Kanäle 32–40 (einstellbar)
Schaltuhr	
Display:	24-Stunden-Floureszens-Digital-Anzeige mit Tagesangabe
Synchronisation:	Quarz-Oszillator
Vorprogrammierzeitraum:	1 Jahr
Programmspeicherplätze:	8 Programme
Mechanische Daten	
Abmessungen (BxHxT):	435x95x376 mm
Gewicht:	7,9 kg
Umgebungstemperatur:	
Betrieb:	5° C–40° C
Lagerung:	-20° C–60° C

Technical specifications:

System Data	
Format:	VHS Pal standard with Hi-Fi audio
Video recording system:	Rotary two-head helical scan system with slant double-azimuth combination video heads
Hi-Fi audio recording system:	Deep-layer recording system conforming to stereo Hi-Fi VHS standard
No. of audio channels:	2 Hi-Fi audio channels 1 normal audio channel
TV Standard:	CCIR-625 lines-Pal
Tape width:	12,65 mm
Tape speed: (SP):	23,39 mm/sec
(LP):	11,70 mm/sec
Maximum recording time: (SP):	max. 4 hours, with E-240 video cassette
(LP):	max. 8 hours, with E-240 video cassette
Connection Data	
Mains connection:	220 V, 50/60 Hz
Power consumption:	40 W (50 W with camera)
Camera connector output:	12 V... max. 8 Watt
Video	
Input:	0,5 to 2,0 $V_{p\text{-}p}$, 75 ohms, unbalanced
Output:	1,0 $V_{p\text{-}p}$, 75 ohms unbalanced
Signal-to-noise ratio:	43 db (Picture Sharpness control at centre position)
Horizontal resolution:	250 lines (with Picture Sharpness control at center position)
Audio	
Input: RCA x 2 socket:	–20 dBs, 50 k-ohms, unbalanced
Scart socket:	–3,8 dBs, high impedance load
Output: RCA x 2 socket:	–6 dBs, high impedance load
Scart socket:	–3,8 dBs, high impedance load
Output impedance:	≦ 1 k-ohm, unbalanced
Signal-to-noise ratio:	≧ 40 dB
Frequency range:	70 Hz to 10,000 Hz
Hi-Fi audio	
Frequency range:	20 Hz to 20,000 Hz
Dynamic range:	≧ 80 dB
Wow and Flutter:	≦ 0,005% WRMS
TV tuner/RF section	
Channel storage capacity:	32 channels
Aerial input:	VHF band 47–89 MHz, 104–300 MHz, 302–470 MHz UHF band IV/V, 470–862 MHz
Aerial output:	UHF chanels 32–40 (Adjustable)
Digital clock/timer	
Clock display:	24-hours fluorescent digital display with day indication
Reference frequency:	Quartz controlled
Start time setting:	Within one year
Programming capacity:	8 programmes
Mechanical Data	
Dimensions (WxHxD):	435x95x376 mm
Weight:	7,9 kg
Temperature	
Operating:	5° C to 40° C
Storage:	-20° C to 60° C

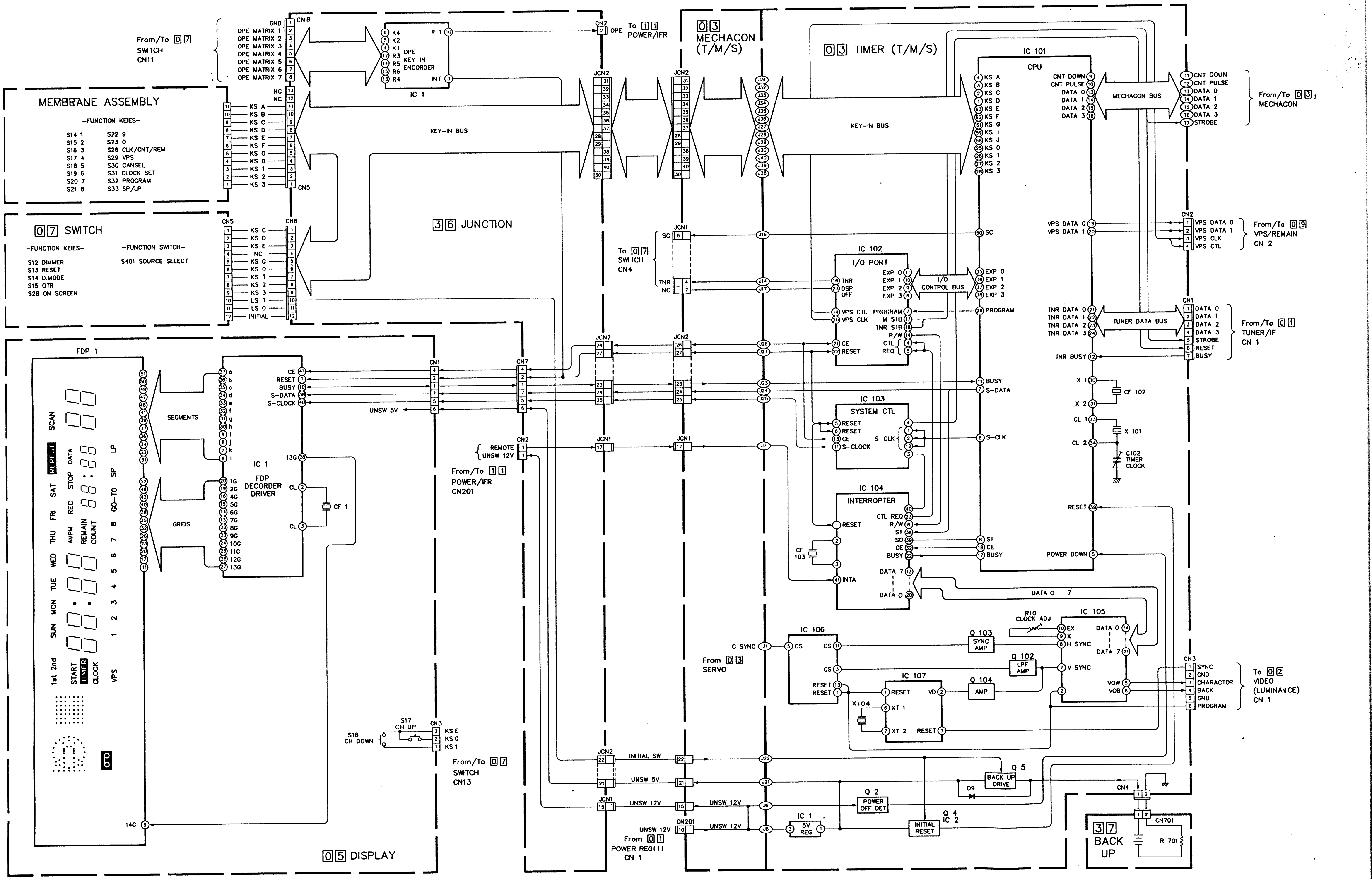


Gesamtverdrahtungsplan
Overall Wiring Diagram

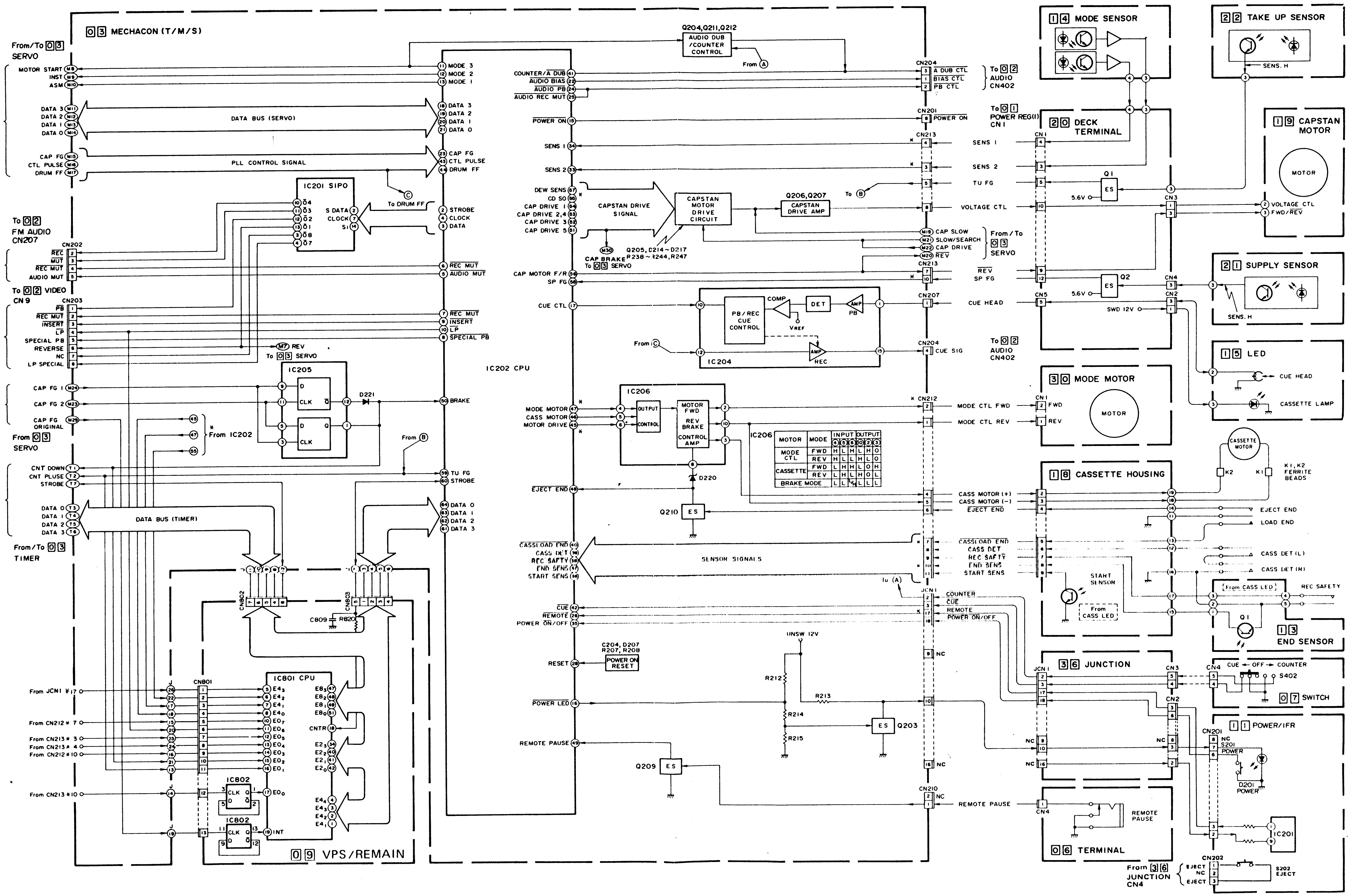

34 POWER REG (2)
32 POWER TRANS.
31 OUTLET
01 POWOR REG (1)
10 RF CONV/MIXER
04 TU/IF
02 V/A/F
35 PRE /REC
17 FE HEAD
08 PRE /MDA
28 DRUM MOTOR
27 DRUM FG
DRUM HEATER
12 A/C HEAD
16 DEMOULATOR
09 VPS /REMAIN
18 CASS HOUSING
13 END SENSOR
30 MODE MOTOR
20 DECK TERMINAL
03 T/M/S
36 JUNCTION
14 MODE SENSOR
15 LED
21 SUPPLY SENSOR
22 TAKE UP SENSOR
19 CAPSTAN MOTOR
11 POWER SWITCH
33 IFR
LEVEL INDICATER
06 TERMINAL
05 DISPLAY
07 SWITCH
MEMBRANE SW
37 BACK UP
20-GA
3-201A
7-12A
8-2A
6-1A
Q1,Q2 ; 2SD636Q,R,S
D3,D4 ; HZS5.6EB1
K1,K2 ; FERRITE BEADS

No.	PWB NAME
38	
37	BACK UP
36	JUNCTION
35	PRE/REC
34	POWER REG (2)
33	IFR
32	POWER TRANS
31	OUTLET
30	MODE MOTOR
29	
28	DRUM MOTOR
27	DRUM FG
26	
25	
24	
23	
22	TAKE UP SENSOR
21	SUPPLY SENSOR
20	DECK TERMINAL
19	CAPSTAN MOTOR
18	CASSETTE HOUSING
17	FE HEAD
16	DEMODULATOR
15	CASSETTE LED
14	MODE SENSOR
13	END SENSOR
12	A/CTL HEAD
11	POWER SW/IFR
10	RF CONV/MIXER
09	VPS/REMAIN
08	PRE/MDA
07	SWITCH
06	TERMINAL
05	DISPLAY
04	TU/IF
03	T/M/S
02	V/A/F
01	POWER REG (1)

Timer/Display-Blockdarstellung
Timer/Display Block Diagram


From/To 07 SWITCH CN11
GND
OPE MATRIX 1
OPE MATRIX 2
OPE MATRIX 3
OPE MATRIX 4
OPE MATRIX 5
OPE MATRIX 6
OPE MATRIX 7
CN8
K4
K2
K1
R3
R5
R6
R4
R 1
OPE KEY-IN ENCODER
INT
IC 1
CN2
OPE
To 11 POWER/IFR
MEMBRANE ASSEMBLY
-FUNCTION KEIES-
S14 1
S15 2
S16 3
S17 4
S18 5
S19 6
S20 7
S21 8
S22 9
S23 0
S26 CLK/CNT/REM
S29 VPS
S30 CANSEL
S31 CLOCK SET
S32 PROGRAM
S33 SP/LP
KS A
KS B
KS C
KS D
KS E
KS F
KS G
KS 0
KS 1
KS 2
KS 3
NC
CN5
KEY-IN BUS
JCN2
03 MECHACON (T/M/S)
03 TIMER (T/M/S)
IC 101
CPU
CNT DOWN
CNT PULSE
DATA 0
DATA 1
DATA 2
DATA 3
MECHACON BUS
STROBE
From/To 03 MECHACON
07 SWITCH
-FUNCTION KEIES-
S12 DIMMER
S13 RESET
S14 D.MODE
S15 OTR
S28 ON SCREEN
-FUNCTION SWITCH-
S401 SOURCE SELECT
CN6
LS 1
LS 0
INITIAL
36 JUNCTION
To 07 SWITCH CN4
JCN1
SC
TNR
NC
IC 102
I/O PORT
TNR
DSP OFF
EXP 0
EXP 1
EXP 2
EXP 3
I/O CONTROL BUS
VPS CTL
VPS CLK
PROGRAM
M SIB
INR SIB
R/W
CE
RESET
CTL
REQ
VPS DATA 0
VPS DATA 1
VPS CLK
VPS CTL
From/To 09 VPS/REMAIN CN 2
TNR DATA 0
TNR DATA 1
TNR DATA 2
TNR DATA 3
TUNER DATA BUS
TNR BUSY
From/To 01 TUNER/IF CN 1
BUSY
S-DATA
X 1
X 2
CL 1
CL 2
CF 102
X 101
C102 TIMER CLOCK
FDP 1
SCAN
REPEAT
DATA
STOP
SAT
FRI
THU
WED
TUE
MON
SUN
1st 2nd
START
TIMER
CLOCK
VPS
REC
AMPM
REMAIN COUNT
GO-TO
SP
LP
SEGMENTS
GRIDS
IC 1
FDP DECORDER DRIVER
CE
RESET
BUSY
S-DATA
S-CLOCK
13G
CL
CF 1
1G
2G
4G
5G
6G
7G
8G
9G
10G
11G
12G
13G
14G
CN1
CN7
UNSW 5V
REMOTE
UNSW 12V
From/To 11 POWER/IFR CN201
IC 103
SYSTEM CTL
S-CLK
S-CLOCK
IC 104
INTERROPTER
CTL REQ
SI
SO
INTA
DATA 7
DATA 0
CF 103
RESET
POWER DOWN
DATA 0 - 7
R10 CLOCK ADJ
IC 105
EX
X
H SYNC
V SYNC
VOW
VOB
IC 106
CS
C SYNC
From 03 SERVO
Q 103 SYNC AMP
Q 102 LPF AMP
Q 104 AMP
IC 107
XT 1
XT 2
VD
X104
CN3
SYNC
CHARACTOR
BACK
PROGRAM
To 02 VIDEO (LUMINANCE) CN 1
S17 CH UP
S18 CH DOWN
KS E
KS 0
KS 1
From/To 07 SWITCH CN13
INITIAL SW
Q 5 BACK UP DRIVE
D9
CN4
Q 2 POWER OFF DET
Q 4 IC 2 INITIAL RESET
IC 1 5V REG
CN201
UNSW 12V
From 01 POWER REG(I) CN 1
37 BACK UP
CN701
R 701
05 DISPLAY

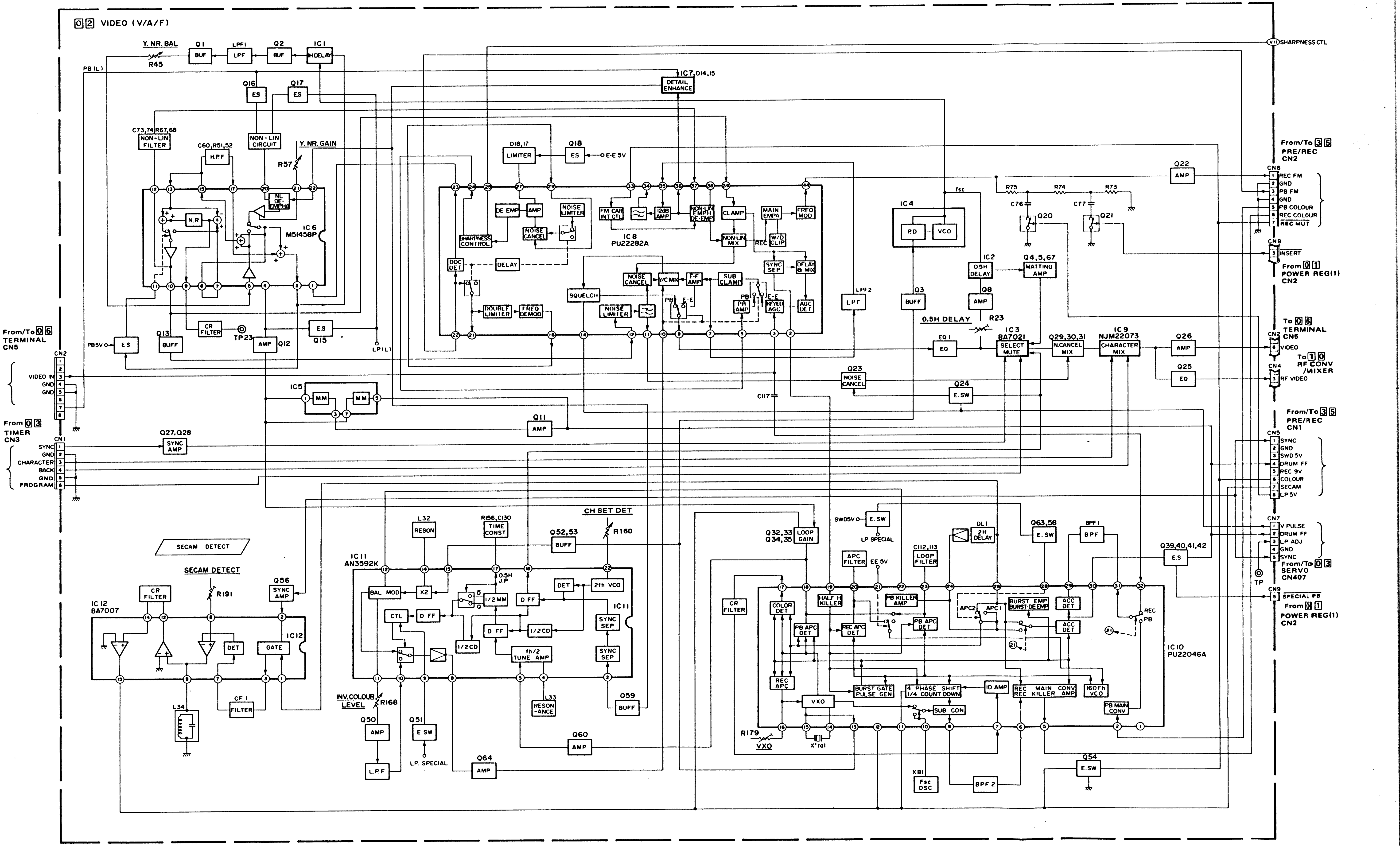
Ablaufsteuerung-Blockdarstellung
Mechanism Control Block Diagram


03 MECHACON (T/M/S)
From/To 03 SERVO
MOTOR START
INST
ASM
DATA 3
DATA 2
DATA 1
DATA 0
DATA BUS (SERVO)
CAP FG
CTL PULSE
DRUM FF
PLL CONTROL SIGNAL
IC201 SIPO
S DATA
CLOCK
SI
To DRUM FF
STROBE
CLOCK
DATA
To 02 FM AUDIO CN207
CN202
REC
MUT
REC MUT
AUDIO MUT
To 02 VIDEO CN 9
CN203
PB
REC MUT
INSERT
LP
SPECIAL PB
REVERSE
NC
LP SPECIAL
M7 REV
To 03 SERVO
IC205
D
CLK
Q
D221
BRAKE
CAP FG 1
CAP FG 2
CAP FG ORIGINAL
From 03 SERVO
* From IC202
From B
CNT DOWN
CNT PLUSE
STROBE
TU FG
DATA BUS (TIMER)
From/To 03 TIMER
CN802
CN803
C809
R820
IC801 CPU
CN801
From JCN1 *17
From CN212 * 7
From CN213 * 3
From CN213 * 4
From CN212 * 10
From CN213 * 10
IC802
CLK
INT
CNTR
09 VPS/REMAIN
IC202 CPU
MODE 3
MODE 2
MODE 1
Q204, Q211, Q212
AUDIO DUB /COUNTER CONTROL
From A
COUNTER/A DUB
AUDIO BIAS
AUDIO PB
AUDIO REC MUT
CN204
A DUB CTL
BIAS CTL
PB CTL
To 02 AUDIO CN402
POWER ON
CN201
To 01 POWER REG(1) CN1
SENS 1
SENS 2
CN213
TU FG
To B
DEW SENS
CD SO
CAP DRIVE 1
CAP DRIVE 2,4
CAP DRIVE 3
CAP DRIVE 5
CAPSTAN DRIVE SIGNAL
CAPSTAN MOTOR DRIVE CIRCUIT
Q206, Q207
CAPSTAN DRIVE AMP
VOLTAGE CTL
M30
CAP BRAKE
To 03 SERVO
Q205, D214 ~ D217
R238 ~ R244, R247
CAP SLOW
SLOW/SEARCH
CAP DRIVE
REV
From/To 03 SERVO
CAP MOTOR F/R
SP FG
CUE CTL
IC204
PB/REC CUE CONTROL
COMP
DET
AMP
PB
VREF
REC
From C
CN207
CUE HEAD
CUE SIG
MODE MOTOR
CASS MOTOR
MOTOR DRIVE
IC206
OUTPUT CONTROL
MOTOR FWD REV BRAKE CONTROL AMP
D220
CN212
MODE CTL FWD
MODE CTL REV
EJECT END
Q210
ES
CASS MOTOR (+)
CASS MOTOR (−)
CASSLOAD END
CASS DET
REC SAFTY
END SENS
START SENS
SENSOR SIGNALS
To (A)
JCN1
COUNTER
CUE
REMOTE
POWER ON/OFF
C204, D207
R207, R208
POWER ON RESET
RESET
UNSW 12V
R212
R213
R214
R215
Q203
POWER LED
NC
REMOTE PAUSE
Q209
CN210
14 MODE SENSOR
22 TAKE UP SENSOR
SENS. H
20 DECK TERMINAL
CN1
Q1
5.6V
CN3
19 CAPSTAN MOTOR
MOTOR
FWD/REV
Q2
CN4
CN2
SWD 12V
CN5
21 SUPPLY SENSOR
15 LED
CASSETTE LAMP
30 MODE MOTOR
FWD
CASSETTE MOTOR
K2
K1
K1, K2 FERRITE BEADS
18 CASSETTE HOUSING
LOAD END
CASS DET (L)
CASS DET (H)
START SENSOR
From CASS LED
REC SAFETY
13 END SENSOR
36 JUNCTION
CUE ← OFF → COUNTER
S402
07 SWITCH
11 POWER/IFR
S201 POWER
D201 POWER
IC201
06 TERMINAL
From 36 JUNCTION CN4
EJECT
S202 EJECT

IC206

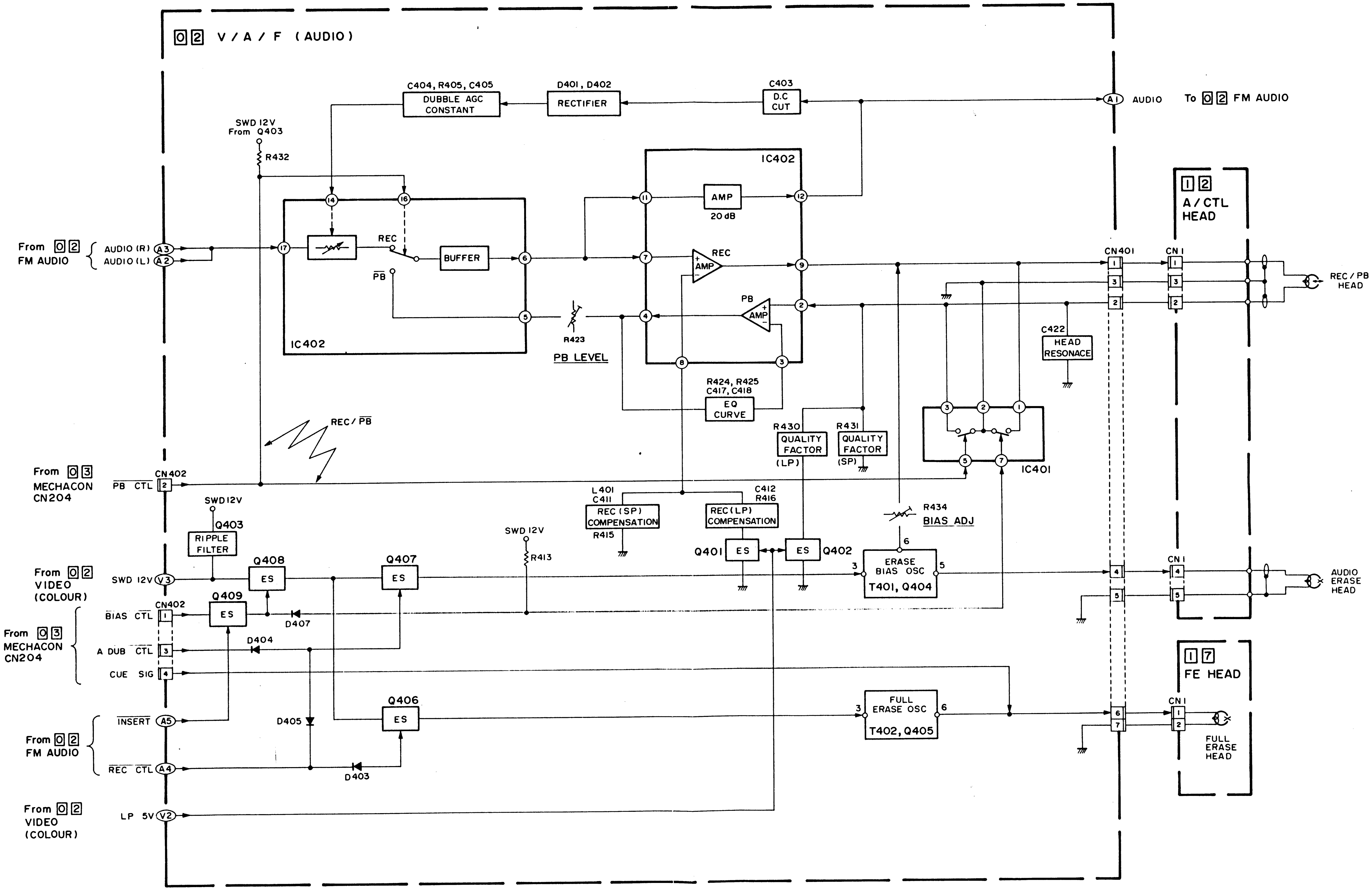
MOTOR	MODE	INPUT ④	INPUT ⑤	INPUT ⑥	OUTPUT ⑩	OUTPUT ②	OUTPUT ③
MODE CTL	FWD	H	L	H	L	H	O
	REV	H	L	L	H	L	O
CASSETTE	FWD	L	H	H	L	O	H
	REV	L	H	L	H	O	L
BRAKE MODE		L	L	L/H	L	L	L

Video-Blockdarstellung
Video Block Diagram



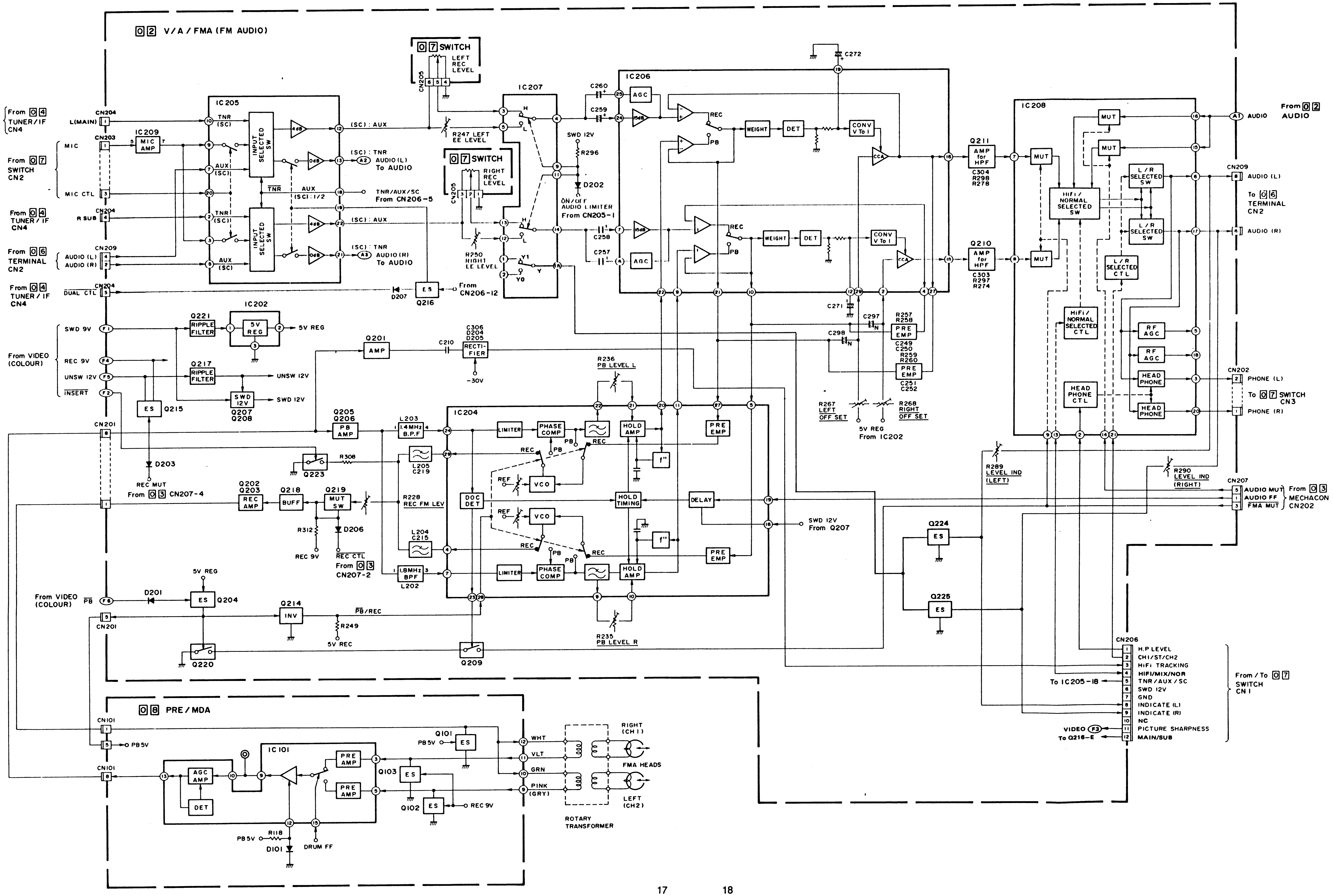
02 VIDEO (V/A/F)
Y. NR. BAL
R45
Q1 BUF
LPF1 LPF
Q2 BUF
IC1 1H DELAY
PB (L)
IC7, D14, 15 DETAIL ENHANCE
Q16 E.S
Q17 E.S
C73,74 R67,68 NON-LIN FILTER
C60, R51,52 H.P.F
NON-LIN CIRCUIT
Y. NR. GAIN
R57
N.R
NL DE-EMPHA
IC6 M51458P
D18,17 LIMITER
Q18 E.S
E-E 5V
DE EMP
AMP
NOISE LIMITER
NOISE CANCEL
SHARPNESS CONTROL
DOC DET
DELAY
DOUBLE LIMITER
FREQ DEMOD
SQUELCH
NOISE LIMITER
NOISE CANCEL
Y/C MIX
F-F AMP
SUB CLAMP
FM CAR INT CTL
12dB AMP
NON-LIN EMPH DE-EMP
CLAMP
MAIN EMPA
FREQ MOD
NON-LIN MIX
REC
W/D CLIP
SYNC SEP
DELAY & MIX
PB AMP
E-E
REC/EE AGC
AGC DET
IC8 PU22282A
CR FILTER
TP23
AMP Q12
E.S Q15
LP (L)
From/To 06 TERMINAL CN5
CN2
PB5V
E.S
Q13 BUFF
VIDEO IN
GND
GND
IC5 M.M M.M
Q11 AMP
From 03 TIMER CN3
CN1
SYNC
GND
CHARACTER
BACK
GND
PROGRAM
Q27,Q28 SYNC AMP
LPF2 LPF
IC4 P.D VCO
fsc
Q3 BUFF
IC2 0.5H DELAY
Q4,5,67 MATTING AMP
Q8 AMP
0.5H DELAY R23
EQ1 EQ
IC3 BA7021 SELECT MUTE
Q29,30,31 N.CANCEL MIX
IC9 NJM22073 CHARACTER MIX
Q26 AMP
Q25 EQ
Q23 NOISE CANCEL
Q24 E.SW
C117
R75 R74 R73
C76 Q20
C77 Q21
Q22 AMP
SHARPNESS CTL
From/To 35 PRE/REC CN2
CN6
REC FM
GND
PB FM
GND
PB COLOUR
REC COLOUR
REC MUT
CN9
INSERT
From 01 POWER REG(1) CN2
To 06 TERMINAL CN5
VIDEO
To 10 RF CONV /MIXER
RF VIDEO
From/To 35 PRE/REC CN1
CN5
SYNC
GND
SWD 5V
DRUM FF
REC 9V
COLOUR
SECAM
LP 5V
CN7
V PULSE
DRUM FF
LP ADJ
GND
SYNC
From/To 03 SERVO CN407
TP
SPECIAL PB
From 01 POWER REG(1) CN2
SECAM DETECT
SECAM DETECT
CR FILTER
R191
Q56 SYNC AMP
IC12 BA7007
DET
GATE
IC12
L34
CF1 FILTER
L32 RESON
R156, C130 TIME CONST
CH SET DET
R160
Q52,53 BUFF
IC11 AN3592K
0.5H J.P
DET
2fh VCO
BAL MOD
X2
1/2MM
D FF
CTL
D FF
SYNC SEP
D FF
1/2CD
1/2CD
fh/2 TUNE AMP
SYNC SEP
IC11
L33 RESON -ANCE
Q59 BUFF
INV.COLOUR LEVEL R168
Q50 AMP
L.P.F
Q51 E.SW
LP. SPECIAL
Q64 AMP
Q60 AMP
SWD5V E.SW
LP SPECIAL
Q32,33 Q34,35 LOOP GAIN
DL1 2H DELAY
Q63,58 E.SW
BPF1 BPF
Q39,40,41,42 E.S
C112,113 LOOP FILTER
APC FILTER EE 5V
CR FILTER
COLOR DET
HALF H KILLER
PB KILLER AMP
APC2 APC1
BURST EMP BURST DE EMP
ACC DET
ACC DET
REC PB
PB APC DET
REC APC DET
PB APC DET
REC APC
VXO
BURST GATE PULSE GEN
4 PHASE SHIFT 1/4 COUNT DOWN
SUB CON
ID AMP
REC MAIN CONV REC KILLER AMP
160Fh VCO
PB MAIN CONV
IC10 PU22046A
R179 VXO
X'tal
XB1 Fsc OSC
BPF 2
Q54 E.SW

Audio-Blockdarstellung
Audio Block Diagram

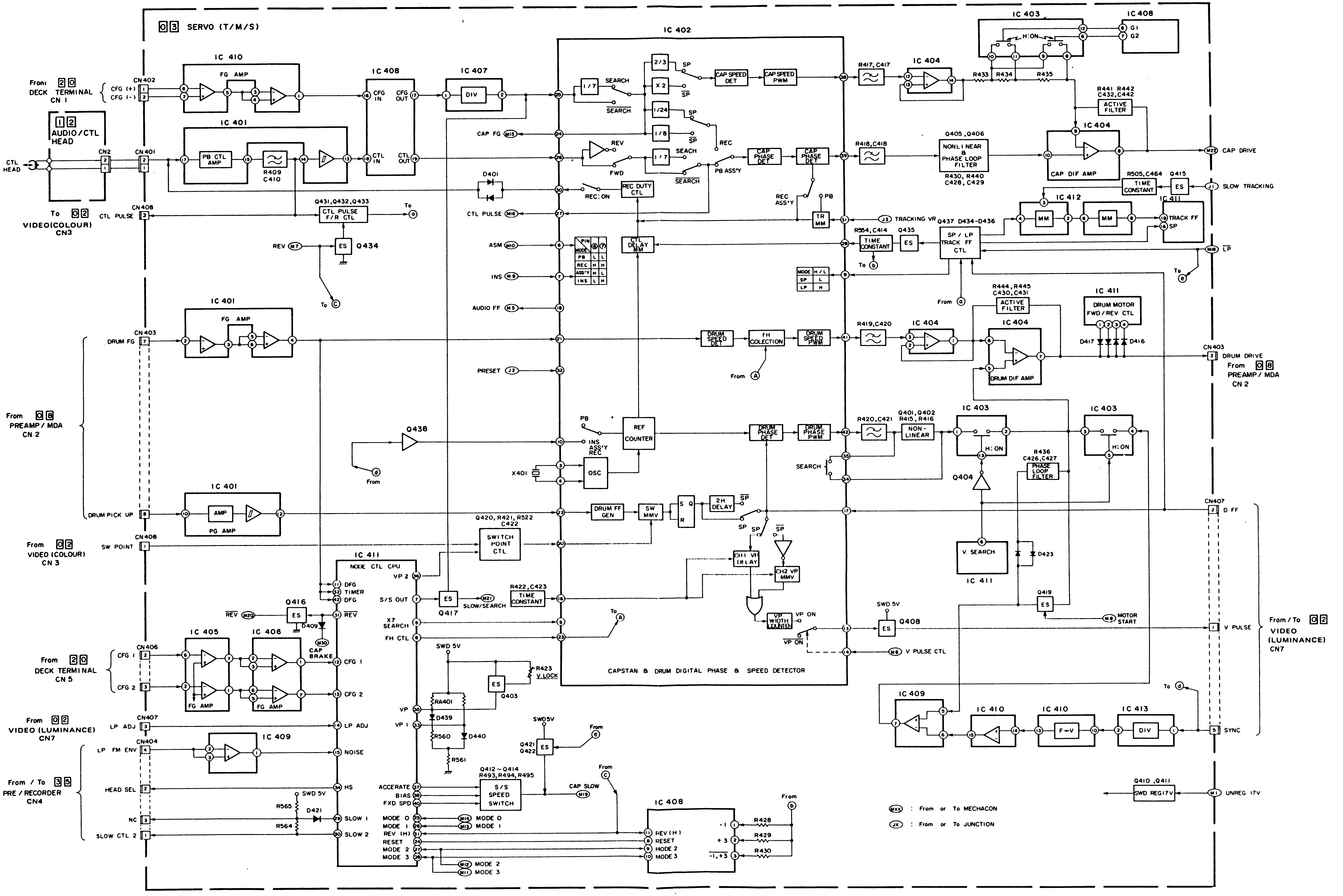


02 V/A/F (AUDIO)
C404, R405, C405
DUBBLE AGC CONSTANT
D401, D402
RECTIFIER
C403
D.C CUT
A1 AUDIO
To 02 FM AUDIO
SWD 12V From Q403
R432
IC402
AMP
20 dB
REC AMP
PB AMP
REC
PB
BUFFER
IC402
R423
PB LEVEL
R424, R425 C417, C418
EQ CURVE
12 A/CTL HEAD
CN401
CN1
REC/PB HEAD
C422
HEAD RESONACE
R430
QUALITY FACTOR (LP)
R431
QUALITY FACTOR (SP)
IC401
REC/PB
From 02 FM AUDIO
AUDIO (R) A3
AUDIO (L) A2
From 03 MECHACON CN204
CN402
PB CTL
SWD12V
Q403
RIPPLE FILTER
L401 C411
REC (SP) COMPENSATION
R415
C412 R416
REC (LP) COMPENSATION
Q401 ES
ES Q402
R434
BIAS ADJ
ERASE BIAS OSC
T401, Q404
SWD 12V
R413
From 02 VIDEO (COLOUR)
SWD 12V V3
Q408 ES
Q407 ES
Q409 ES
D407
D404
From 03 MECHACON CN204
BIAS CTL
A DUB CTL
CUE SIG
AUDIO ERASE HEAD
17 FE HEAD
FULL ERASE OSC
T402, Q405
Q406 ES
D405
D403
From 02 FM AUDIO
INSERT A5
REC CTL A4
FULL ERASE HEAD
From 02 VIDEO (COLOUR)
LP 5V V2

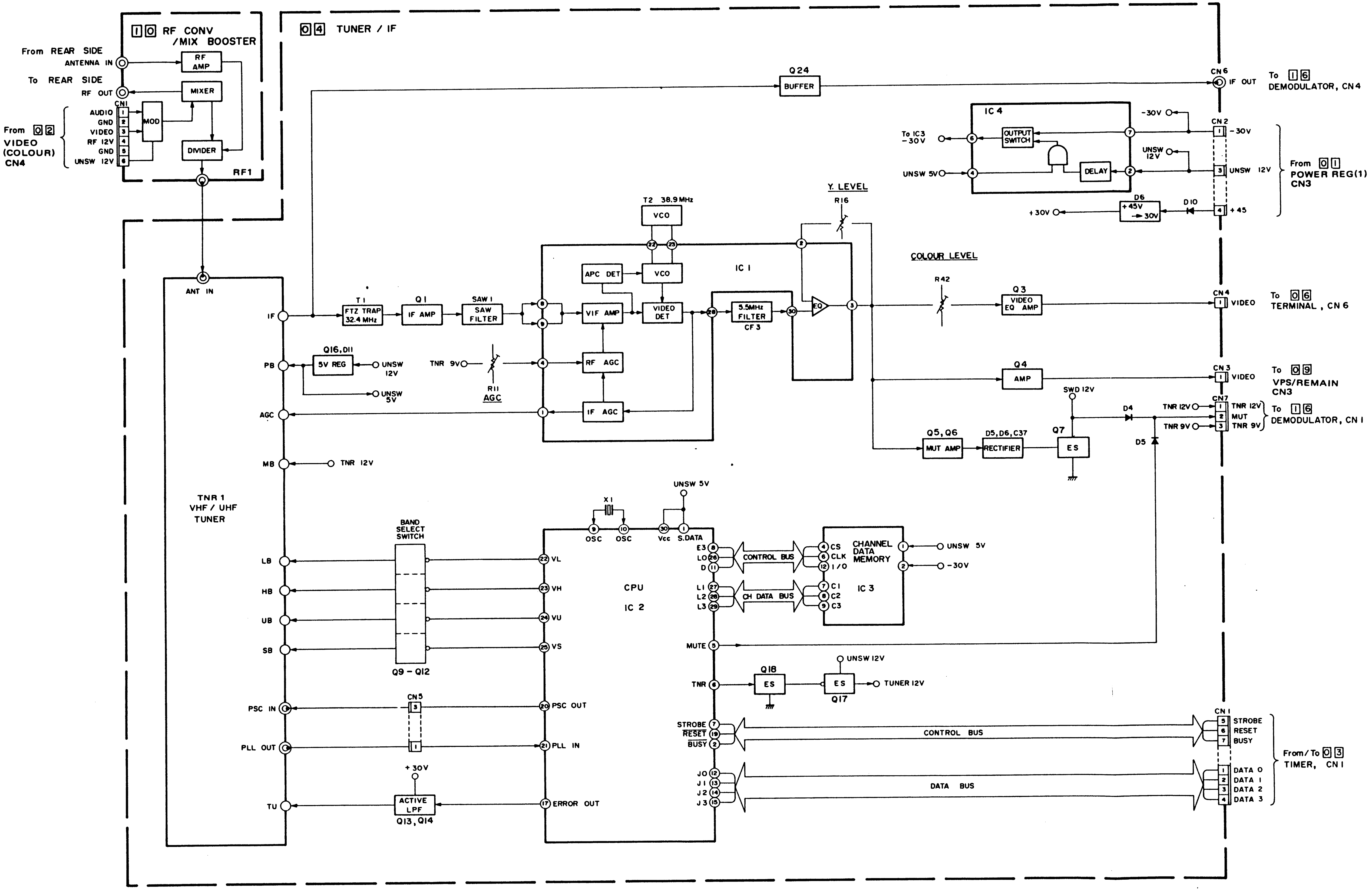
FM Audio-Blockdarstellung
FM Audio Block Diagram


02 V/A/FMA (FM AUDIO)
07 SWITCH
LEFT REC LEVEL
CN205
IC207
IC206
IC205
IC208
IC209
MIC AMP
From 04 TUNER/IF CN4
From 07 SWITCH CN2
From 06 TERMINAL CN2
CN204
L(MAIN)
CN203
MIC
MIC CTL
R SUB
CN209
AUDIO (L)
AUDIO (R)
DUAL CTL
TNR (SC)
AUX (SC)
INPUT SELECTED SW
4dB
0dB
(SC): AUX
(SC): TNR
AUDIO (L) To AUDIO
AUDIO (R) To AUDIO
TNR
AUX
(SC): 1/2
TNR/AUX/SC From CN206-5
R247 LEFT EE LEVEL
07 SWITCH
RIGHT REC LEVEL
R250 RIGHT EE LEVEL
ES
Q216
D207
From CN206-12
C260
C259
SWD 12V
R296
D202
ON/OFF AUDIO LIMITER From CN205-1
C258
C257
AGC
10dB
REC
PB
WEIGHT
DET
CONV V To I
CCA
C272
C271
C297
C298
R257 R258
PRE EMP
C249 C250 R259 R260
C251 C252
R267 LEFT OFF SET
R268 RIGHT OFF SET
5V REG From IC202
Q211 AMP for HPF C304 R298 R278
Q210 AMP for HPF C303 R297 R274
MUT
HiFi/NORMAL SELECTED SW
L/R SELECTED SW
L/R SELECTED CTL
HiFi/NORMAL SELECTED CTL
RF AGC
HEAD PHONE
HEAD PHONE CTL
From 02 AUDIO
A1 AUDIO
To 06 TERMINAL CN2
CN202
PHONE (L)
PHONE (R)
To 07 SWITCH CN3
R289 LEVEL IND (LEFT)
R290 LEVEL IND (RIGHT)
CN207
AUDIO MUT
AUDIO FF
FMA MUT
From 03 MECHACON CN202
From VIDEO (COLOUR)
SWD 9V
REC 9V
UNSW 12V
INSERT
Q221 RIPPLE FILTER
IC202 5V REG
5V REG
Q217 RIPPLE FILTER
SWD 12V
Q207 Q208
Q215
D203
REC MUT From 03 CN207-4
Q201 AMP
C210
C306 D204 D205 RECTI-FIER
-30V
R236 PB LEVEL L
Q205 Q206 PB AMP
L203 1.4MHz B.P.F
L205 C219
R308
Q223
Q202 Q203 REC AMP
Q218 BUFF
Q219 MUT SW
R228 REC FM LEV
R312
D206
REC 9V
REC CTL From 03 CN207-2
L204 C215
L202 1.8MHz BPF
IC204
LIMITER
PHASE COMP
HOLD AMP
HOLD TIMING
VCO
REF
DOC DET
DELAY
f"
SWD 12V From Q207
Q224 ES
Q225 ES
R235 PB LEVEL R
CN201
From VIDEO (COLOUR) PB
D201
5V REG
ES Q204
Q214 INV
PB/REC
R249
5V REC
Q220
Q209
CN206
H.P LEVEL
CH1/ST/CH2
HiFi TRACKING
HIFI/MIX/NOR
TNR/AUX/SC
SWD 12V
GND
INDICATE (L)
INDICATE (R)
NC
PICTURE SHARPNESS
MAIN/SUB
From/To 07 SWITCH CN1
To IC205-18
VIDEO F3 To Q216-E
08 PRE/MDA
CN101
PB5V
Q101 ES
IC101
AGC AMP
DET
PRE AMP
Q103 ES
Q102 ES
REC 9V
R118
D101
DRUM FF
WHT
VLT
GRN
PINK (GRY)
RIGHT (CH1)
FMA HEADS
LEFT (CH2)
ROTARY TRANSFORMER

Servo-Blockdarstellung
Servo Block Diagram

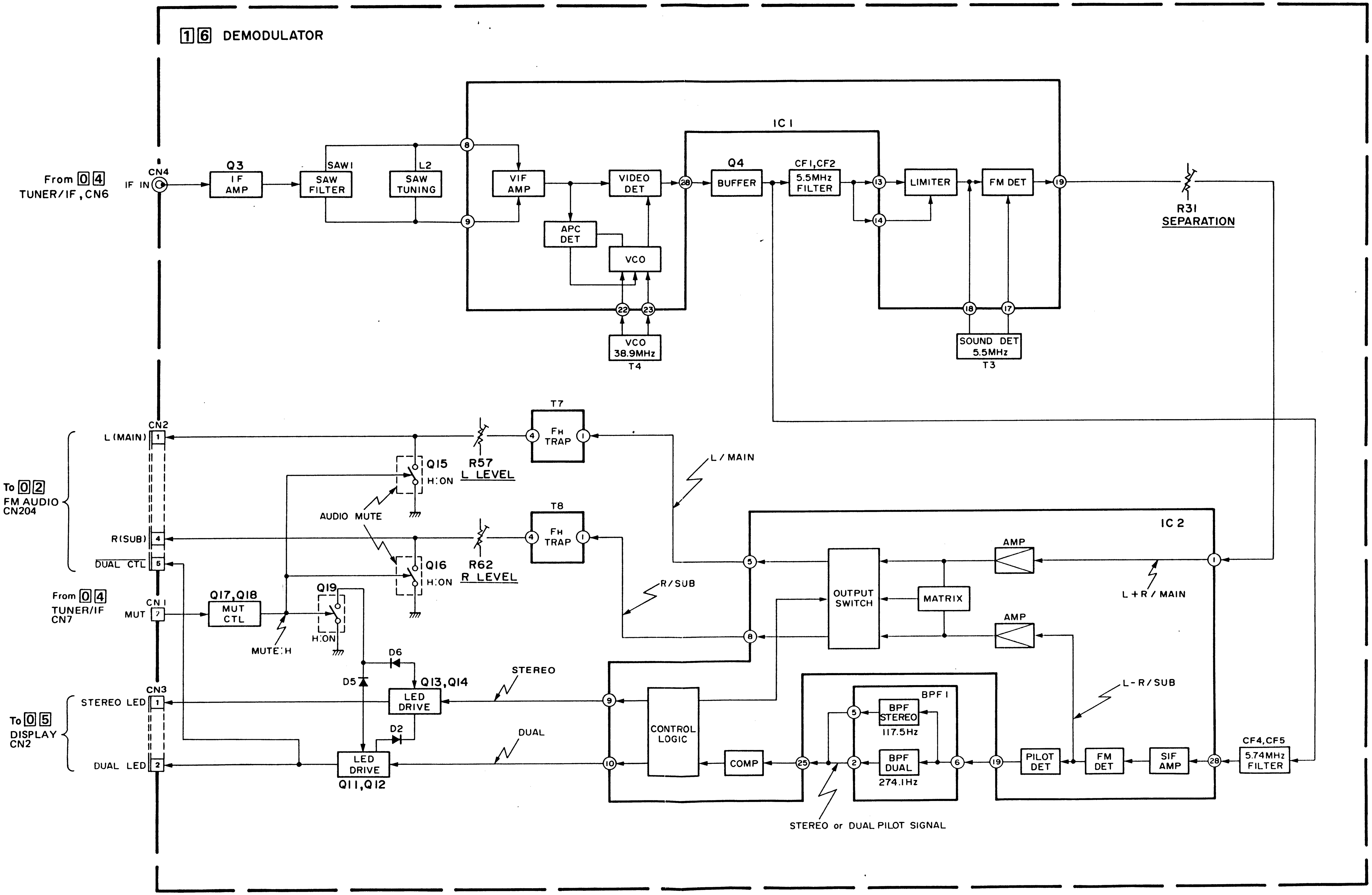

03 SERVO (T/M/S)
From 20 DECK TERMINAL CN 1
CFG (+)
CFG (-)
CN402
12 AUDIO/CTL HEAD
CTL HEAD
CN2
CN401
To 02 VIDEO(COLOUR) CN3
CTL PULSE
CN408
IC 410
FG AMP
IC 401
PB CTL AMP
R409 C410
IC 408
CFG IN
CFG OUT
CTL IN
CTL OUT
IC 407
DIV
Q431,Q432,Q433
CTL PULSE F/R CTL
REV
ES
Q434
IC 402
1/7
SEARCH
2/3
X 2
1/24
1/8
SP
REC
FWD
CAP SPEED DET
CAP SPEED PWM
CAP PHASE DET
PB ASS'Y
REC ASS'Y
PB
TR MM
REC:ON
REC DUTY CTL
D401
CAP FG
CTL PULSE
ASM
INS
AUDIO FF
PRESET
MODE
PB
REC
ASS'Y
INS
CTL DELAY MM
DRUM SPEED DET
fH COLECTION
DRUM SPEED PWM
From Ⓐ
REF COUNTER
INS ASS'Y REC
OSC
X401
DRUM PHASE DET
DRUM PHASE PWM
SEARCH
DRUM FF GEN
SW MMV
2H DELAY
CH1 VP DELAY
CH2 VP MMV
VP WIDTH COUNTER
VP ON
SWITCH POINT CTL
Q420, R421, R522 C422
R422,C423 TIME CONSTANT
CAPSTAN & DRUM DIGITAL PHASE & SPEED DETECTOR
IC 403
H:ON
G1
G2
IC 404
R417, C417
R433 R434 R435
R441 R442 C432,C442
ACTIVE FILTER
R418,C418
Q405,Q406
NONLINEAR & PHASE LOOP FILTER
R430, R440 C428, C429
CAP DIF AMP
CAP DRIVE
R505,C464 TIME CONSTANT
Q415
SLOW TRACKING
IC 412
MM
IC 411
TRACK FF
TRACKING VR
R554,C414 TIME CONSTANT
Q435
Q437 D434-D436
SP / LP TRACK FF CTL
LP
To ⓑ
From ⓐ
R444,R445 C430,C431
DRUM MOTOR FWD/REV CTL
D417
D416
R419,C420
DRUM DIF AMP
CN403
DRUM DRIVE
From 08 PREAMP/MDA CN 2
R420,C421
Q401,Q402 R415, R416
NON-LINEAR
R436 C426,C427 PHASE LOOP FILTER
Q404
V. SEARCH
D423
Q419
MOTOR START
SWD 5V
Q408
V PULSE
V PULSE CTL
CN407
D FF
From/To 02 VIDEO (LUMINANCE) CN7
SYNC
IC 409
IC 413
F→V
To ⓓ
Q410, Q411
SWD REG17V
UNREG 17V
Mxx : From or To MECHACON
Jx : From or To JUNCTION
DRUM FG
From 08 PREAMP/MDA CN 2
Q438
From ⓓ
AMP
PG AMP
DRUM PICK UP
From 02 VIDEO (COLOUR) CN 3
SW POINT
IC 411
MODE CTL CPU
VP 2
DFG
TIMER
REV
Q416
D409
CAP BRAKE
S/S OUT
Q417
SLOW/SEARCH
X7 SEARCH
FH CTL
To Ⓐ
SWD 5V
R423 V.LOCK
Q403
VP
VP 1
RA401
D439
R560
D440
R561
Q421 Q422
From ⓔ
Q412~Q414 R493,R494,R495
S/S SPEED SWITCH
CAP SLOW
ACCERATE
BIAS
FXD SPD
MODE 0
MODE 1
REV (H)
RESET
MODE 2
MODE 3
IC 408
From ⓒ
From ⓑ
-1
+3
-1,+3
R428
R429
R430
IC 405
IC 406
CN406
From 20 DECK TERMINAL CN 5
CFG 1
CFG 2
FG AMP
From 02 VIDEO (LUMINANCE) CN7
LP ADJ
CN404
LP FM ENV
NOISE
From / To 35 PRE / RECORDER CN4
HEAD SEL
HS
NC
SLOW CTL 2
SWD 5V
R565
R564
D421
SLOW 1
SLOW 2

Tuner/ZF-Blockdarstellung
Tuner/IF Block Diagram

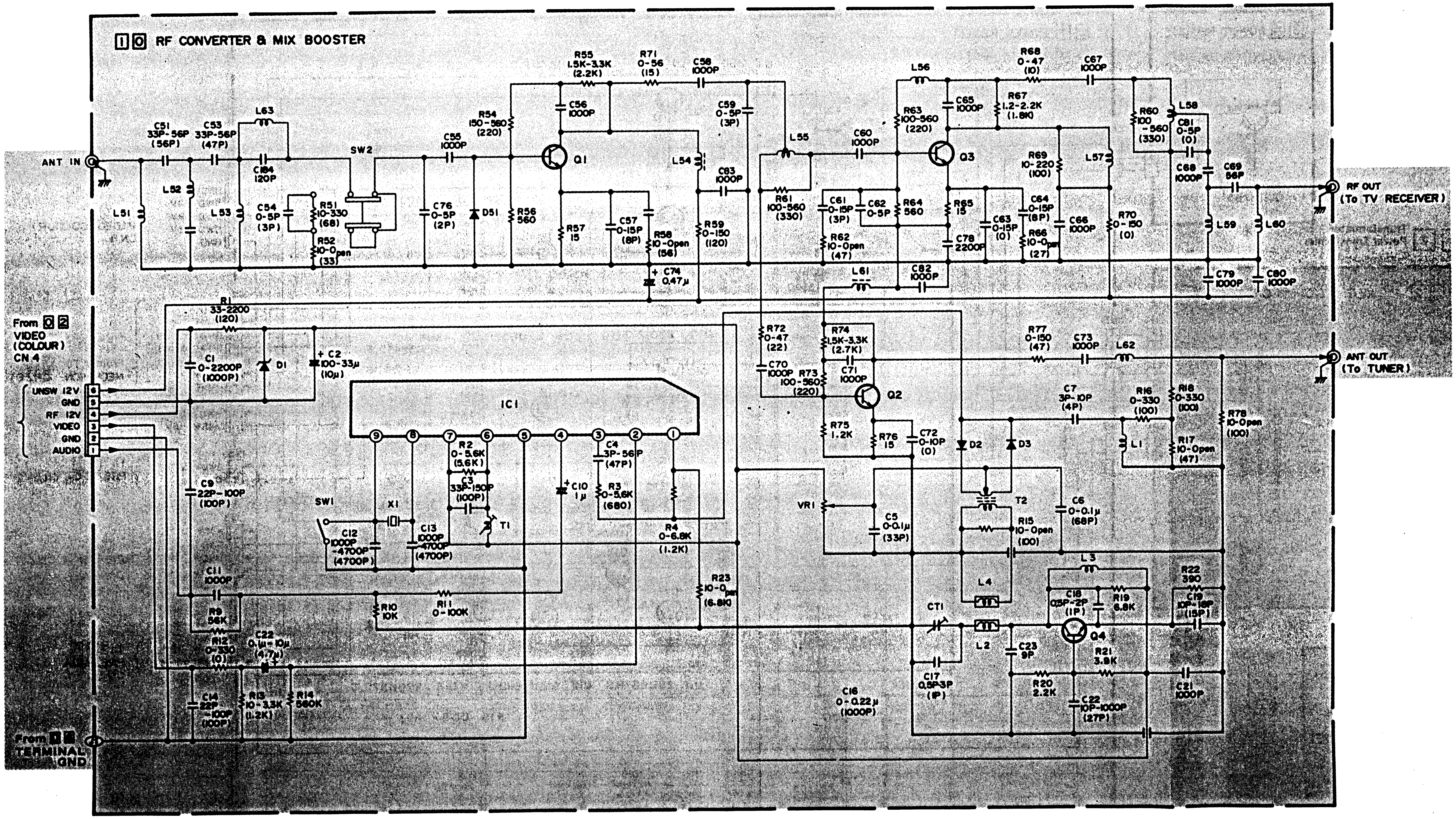


10 RF CONV /MIX BOOSTER
From REAR SIDE
ANTENNA IN
To REAR SIDE
RF OUT
RF AMP
MIXER
MOD
DIVIDER
RF1
CN1
AUDIO 1
GND 2
VIDEO 3
RF 12V 4
GND 5
UNSW 12V 6
From 02 VIDEO (COLOUR) CN4
04 TUNER / IF
ANT IN
TNR 1 VHF / UHF TUNER
IF
PB
AGC
MB
LB
HB
UB
SB
PSC IN
PLL OUT
TU
Q24 BUFFER
T1 FTZ TRAP 32.4 MHz
Q1 IF AMP
SAW 1 SAW FILTER
Q16, D11 5V REG
UNSW 12V
UNSW 5V
TNR 9V
R11 AGC
TNR 12V
T2 38.9 MHz VCO
IC 1
APC DET
VCO
VIF AMP
VIDEO DET
RF AGC
IF AGC
5.5MHz FILTER CF 3
EQ
Y. LEVEL
R16
COLOUR LEVEL
R42
Q3 VIDEO EQ AMP
Q4 AMP
Q5, Q6 MUT AMP
D5, D6, C37 RECTIFIER
Q7 ES
SWD 12V
D4
D5
IC 4
OUTPUT SWITCH
DELAY
To IC3 -30V
UNSW 5V
-30V
UNSW 12V
D6 +45V → 30V
D10
+30V
CN 6 IF OUT
To 16 DEMODULATOR, CN4
CN 2
1 -30V
3 UNSW 12V
4 +45
From 01 POWER REG(1) CN3
CN 4 1 VIDEO
To 06 TERMINAL, CN 6
CN 3 1 VIDEO
To 09 VPS/REMAIN CN3
CN7
TNR 12V
1 TNR 12V
2 MUT
3 TNR 9V
TNR 9V
To 16 DEMODULATOR, CN 1
BAND SELECT SWITCH
Q9 – Q12
CN5
+30V
ACTIVE LPF
Q13, Q14
X1
OSC
OSC
Vcc
S.DATA
UNSW 5V
CPU
IC 2
VL
VH
VU
VS
PSC OUT
PLL IN
ERROR OUT
E3
LO
D
L1
L2
L3
MUTE
TNR
STROBE
RESET
BUSY
J0
J1
J2
J3
CONTROL BUS
CH DATA BUS
CS
CLK
I/O
C1
C2
C3
CHANNEL DATA MEMORY
IC 3
UNSW 5V
-30V
Q18 ES
Q17 ES
UNSW 12V
TUNER 12V
CONTROL BUS
DATA BUS
CN 1
5 STROBE
6 RESET
7 BUSY
1 DATA 0
2 DATA 1
3 DATA 2
4 DATA 3
From/To 03 TIMER, CN 1

Demodulator-Blockdarstellung
Demodulator Block Diagram


16 DEMODULATOR
From 04 TUNER/IF, CN6
CN4
IF IN
Q3
IF AMP
SAW1
SAW FILTER
L2
SAW TUNING
8
9
VIF AMP
VIDEO DET
APC DET
VCO
22
23
VCO 38.9MHz
T4
IC 1
28
Q4
BUFFER
CF1,CF2
5.5MHz FILTER
13
14
LIMITER
FM DET
19
18
17
SOUND DET 5.5MHz
T3
R31
SEPARATION
CN2
L (MAIN)
1
R(SUB)
4
DUAL CTL
5
To 02 FM AUDIO CN204
T7
FH TRAP
R57
L LEVEL
Q15
H:ON
AUDIO MUTE
T8
R62
R LEVEL
Q16
H:ON
L/MAIN
R/SUB
From 04 TUNER/IF CN7
CN1
MUT
7
Q17,Q18
MUT CTL
MUTE:H
Q19
H:ON
D6
D5
Q13,Q14
LED DRIVE
D2
LED DRIVE
Q11,Q12
STEREO
DUAL
CN3
STEREO LED
DUAL LED
To 05 DISPLAY CN2
IC 2
AMP
OUTPUT SWITCH
MATRIX
L+R/MAIN
L-R/SUB
CONTROL LOGIC
COMP
25
BPF1
BPF STEREO 117.5Hz
BPF DUAL 274.1Hz
6
PILOT DET
FM DET
SIF AMP
CF4,CF5
5.74MHz FILTER
STEREO or DUAL PILOT SIGNAL

1 0 HF-Modulator/Antennenverstärker
RF Converter/Mix Booster

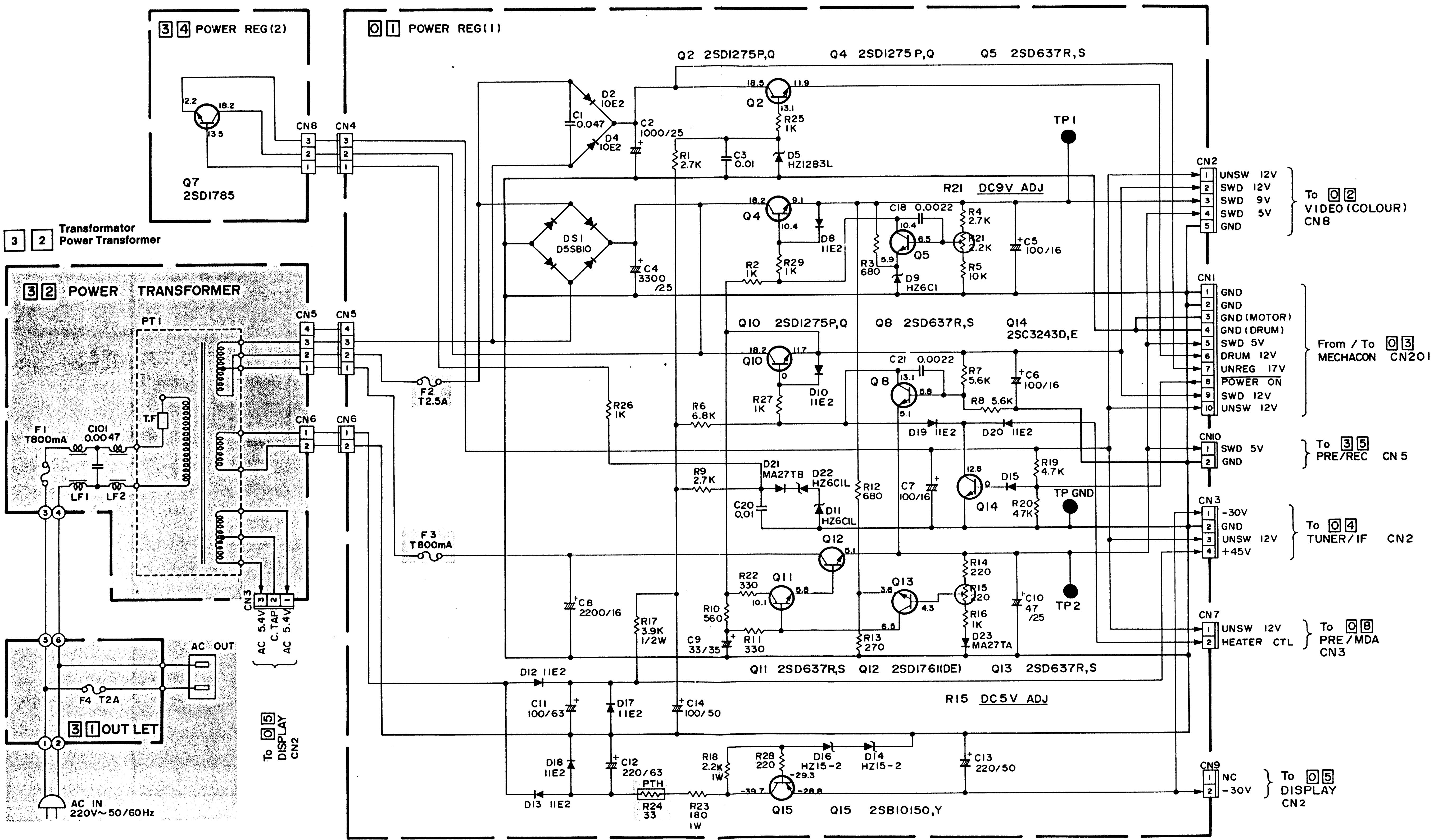


10 RF CONVERTER & MIX BOOSTER
ANT IN
C51 33P-56P (56P)
C53 33P-56P (47P)
L63
C184 12OP
L51
L52
L53
C54 0-5P (3P)
R51 10-330 (68)
R52 10-Open (33)
SW2
C55 1000P
C76 0-5P (2P)
D51
R54 150-560 (220)
R56 560
R55 1.5K-3.3K (2.2K)
R71 0-56 (15)
C58 1000P
C56 1000P
Q1
R57 15
C57 0-15P (8P)
R58 10-Open (56)
C74 0.47μ
C59 0-5P (3P)
L54
C83 1000P
R59 0-150 (120)
L55
R61 100-560 (330)
C60 1000P
C61 0-15P (3P)
C62 0-5P
R62 10-Open (47)
R64 560
L56
R63 100-560 (220)
C65 1000P
Q3
R65 15
C78 2200P
R68 0-47 (10)
R67 1.2-2.2K (1.8K)
C67 1000P
R69 10-220 (100)
C63 0-15P (0)
C64 0-15P (8P)
R66 10-Open (27)
C66 1000P
L57
R70 0-150 (0)
R60 100-560 (330)
L58
C81 0-5P (0)
C68 1000P
C69 56P
L59
L60
C79 1000P
C80 1000P
RF OUT (To TV RECEIVER)
L61
C82 1000P
From 02 VIDEO (COLOUR) CN 4
UNSW 12V 6
GND 5
RF 12V 4
VIDEO 3
GND 2
AUDIO 1
R1 33-2200 (120)
C1 0-2200P (1000P)
D1
C2 100-33μ (10μ)
IC1
C9 22P-100P (100P)
SW1
X1
C12 1000P-4700P (4700P)
C13 1000P-4700P (4700P)
R2 0-5.6K (5.6K)
C3 33P-150P (100P)
T1
C10 1μ
C4 3P-56P (47P)
R3 0-5.6K (680)
R4 0-6.8K (1.2K)
R23 10-Open (6.8K)
C11 1000P
R9 56K
R10 10K
R11 0-100K
R12 0-330 (0)
C22 0.1μ-10μ (4.7μ)
C14 22P-100P (100P)
R13 10-3.3K (1.2K)
R14 560K
From 02 TERMINAL GND
R72 0-47 (22)
C70 1000P
R73 100-560 (220)
R74 1.5K-3.3K (2.7K)
C71 1000P
Q2
R75 1.2K
R76 15
C72 0-10P (0)
R77 0-150 (47)
C73 1000P
L62
ANT OUT (To TUNER)
C7 3P-10P (4P)
R16 0-330 (100)
R18 0-330 (100)
R78 10-Open (100)
L1
R17 10-Open (47)
D2
D3
VR1
C5 0-0.1μ (33P)
T2
C6 0-0.1μ (68P)
R15 10-Open (100)
L3
L4
CT1
L2
C18 0.5P-2P (1P)
R19 6.8K
Q4
R22 390
C19 10P-18P (15P)
C23 9P
R21 3.9K
C17 0.5P-3P (1P)
R20 2.2K
C22 0P-1000P (27P)
C21 1000P
C16 0-0.22μ (1000P)

NOTE. IC1 : LA7053 or Equivalent.
Q1-3: 2SC3355, 2SC2570A, 2SC3512, 2SC3510 or Equivalent.
Q4 : 2SC2759, 2SC2754, 2SC2734 or Equivalent.
D1 : HZ7C2, RD7.5 or Equivalent.
D2, 3: 1SS174 or Equivalent.
D51 : 1S2076, 1SS133, 1S2473 or Equivalent.
X1 : CSB500E5, CSB500E53, KAR-500AH or Equivalent.

0 1 Netzteil-Schaltung (1)
Regulator Schematic Diagram (1)

3 4 Netzteil-Schaltung (2)
Regulator Schematic Diagram (2)



3 4 POWER REG(2)
Q7
2SD1785
CN8
CN4
0 1 POWER REG(1)
Q2 2SD1275P,Q
Q4 2SD1275P,Q
Q5 2SD637R,S
3 2 Transformator
Power Transformer
3 2 POWER TRANSFORMER
PT1
T.F
F1 T800mA
C101 0.0047
LF1
LF2
CN5
CN6
CN3
AC 5.4V
C.TAP
AC 5.4V
F2 T2.5A
F3 T800mA
D2 10E2
D4 10E2
C1 0.047
C2 1000/25
R1 2.7K
C3 0.01
R25 1K
D5 HZ12B3L
DS1 D5SB10
C4 3300/25
R2 1K
R29 1K
D8 11E2
R3 680
D9 HZ6C1
C18 0.0022
R4 2.7K
R21 2.2K
R5 10K
C5 100/16
R21 DC9V ADJ
TP1
Q10 2SD1275P,Q
Q8 2SD637R,S
Q14 2SC3243D,E
R27 1K
D10 11E2
C21 0.0022
R7 5.6K
C6 100/16
R8 5.6K
R26 1K
R6 6.8K
D19 11E2
D20 11E2
R9 2.7K
D21 MA27TB
D22 HZ6C1L
D11 HZ6C1L
C20 0.01
R12 680
C7 100/16
D15
R19 4.7K
R20 47K
TP GND
Q12
Q11
Q13
R22 330
R10 560
R11 330
C9 33/35
R13 270
R14 220
R15 220
R16 1K
D23 MA27TA
C10 47/25
TP2
C8 2200/16
R17 3.9K 1/2W
Q11 2SD637R,S
Q12 2SD1761(DE)
Q13 2SD637R,S
R15 DC5V ADJ
D12 11E2
C11 100/63
D17 11E2
C14 100/50
D18 11E2
C12 220/63
D13 11E2
PTH
R24 33
R18 2.2K 1W
R23 180 1W
R28 220
D16 HZ15-2
D14 HZ15-2
C13 220/50
Q15
Q15 2SB1015O,Y
CN2
UNSW 12V
SWD 12V
SWD 9V
SWD 5V
GND
To 0 2 VIDEO (COLOUR) CN8
CN1
GND
GND
GND (MOTOR)
GND (DRUM)
SWD 5V
DRUM 12V
UNREG 17V
POWER ON
SWD 12V
UNSW 12V
From / To 0 3 MECHACON CN201
CN10
SWD 5V
GND
To 3 5 PRE/REC CN 5
CN3
-30V
GND
UNSW 12V
+45V
To 0 4 TUNER/IF CN2
CN7
UNSW 12V
HEATER CTL
To 0 8 PRE/MDA CN3
CN9
NC
-30V
To 0 5 DISPLAY CN2
To 0 5 DISPLAY CN2
AC OUT
F4 T2A
3 1 OUT LET
AC IN
220V~50/60Hz

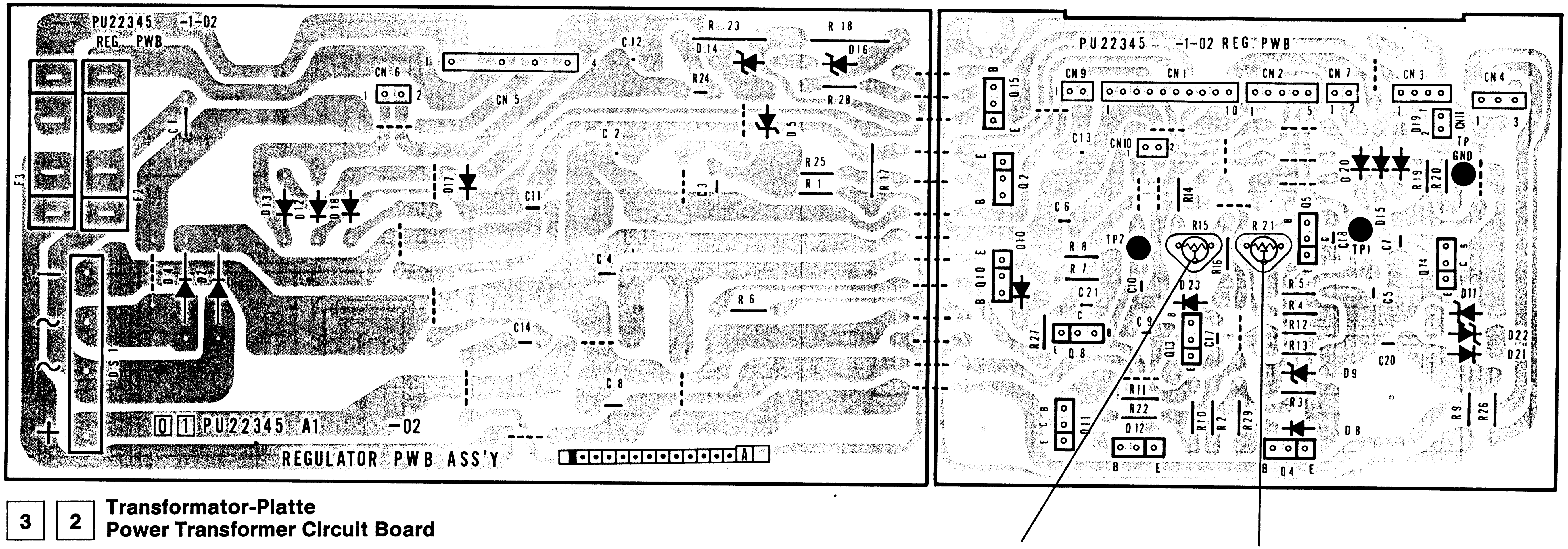
3 1 Netzanschluß
Outlet

NOTES:
1. Shaded (■) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during stop mode.

Alle Gleichspannungen sind mit einem Digitalvoltmeter im Wiedergabe-Betrieb gemessen.

Grau unterlegte Bauteile sind Sicherheitsbauteile und dürfen nur durch Originalteile ersetzt werden!

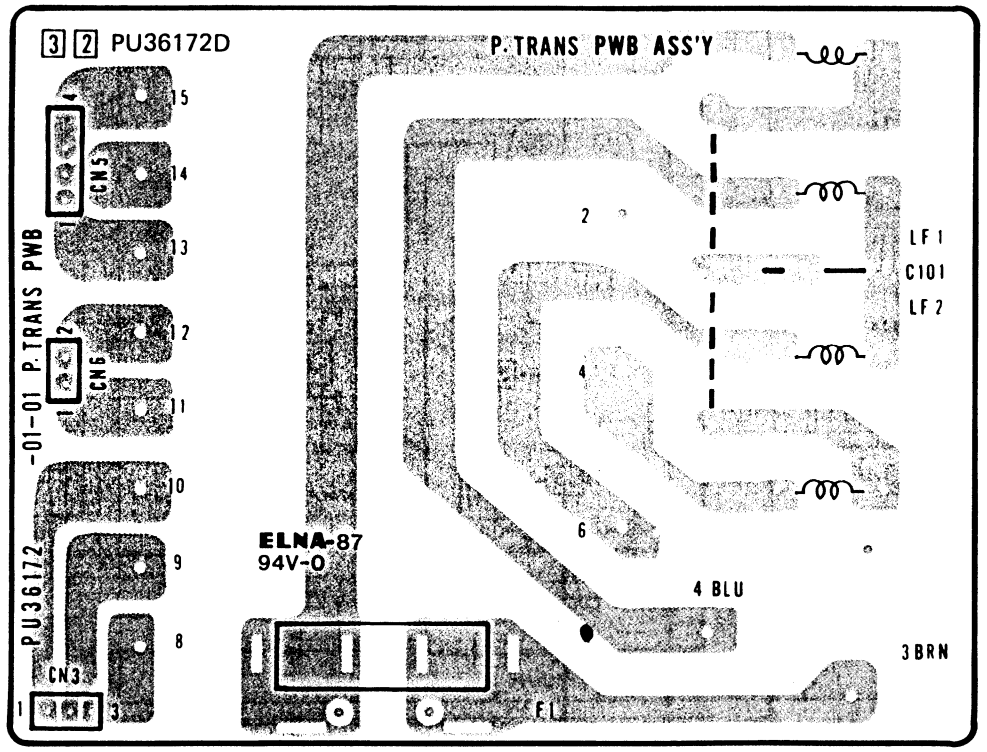
0 1 Netzteil-Platte (1)
Regulator Circuit Board (1)


PU22345 -1-02
REG. PWB
01 PU22345 A1 -02
REGULATOR PWB ASS'Y
PU22345 -1-02 REG. PWB
CN1
CN2
CN3
CN4
CN5
CN6
CN7
CN9
CN10
CN11
F2
F3
DS1
TP1
TP2
TP GND
R15
R21

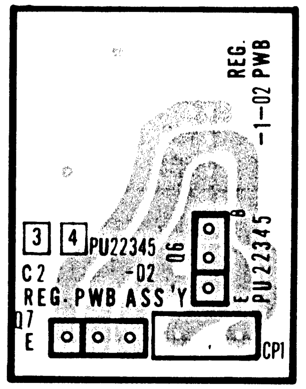
R15
DC 5V ADJ

R21
DC 9V ADJ

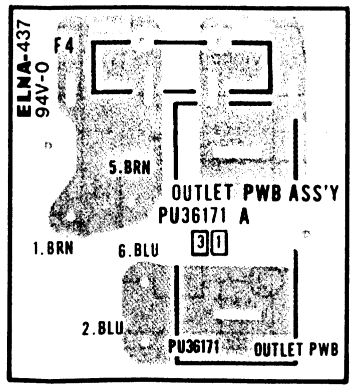
3 2 Transformator-Platte
Power Transformer Circuit Board


32 PU36172D
P. TRANS PWB ASS'Y
PU36172 -01-01 P.TRANS PWB
CN3
CN5
CN6
LF1
C101
LF2
ELNA-87
94V-0
4 BLU
3 BRN
F1

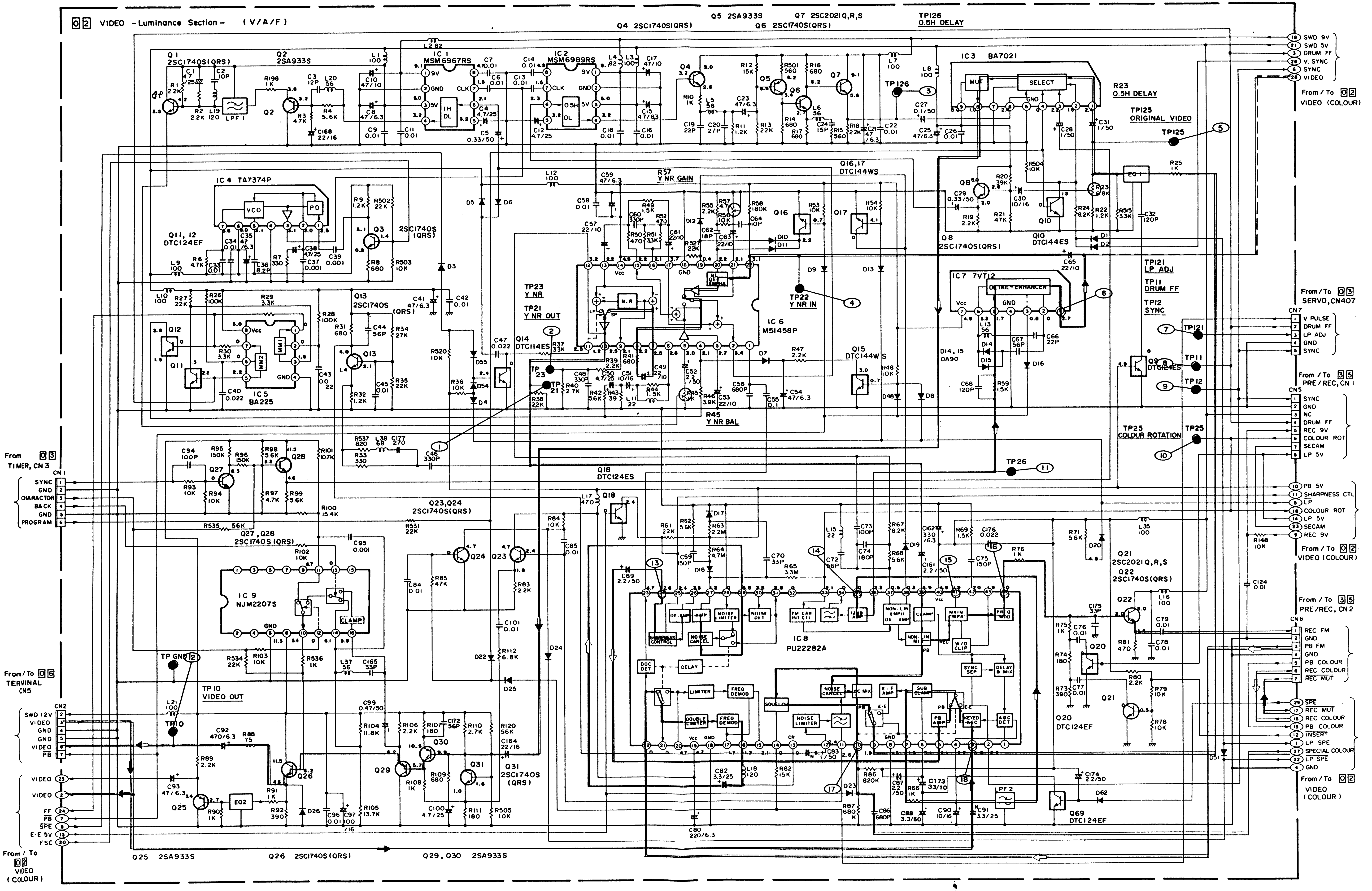
3 4 Netzteil-Platte (2)
Regulator Circuit Board (2)


REG. -1-02 PWB
34 PU22345 -02
REG. PWB ASS'Y
PU22345
C2
CP1

3 1 Netzanschluß-Platte
Outlet Circuit Board


ELNA-437
94V-0
F4
5.BRN
OUTLET PWB ASS'Y
PU36171 A
1.BRN
6.BLU
31
2.BLU
PU36171 OUTLET PWB

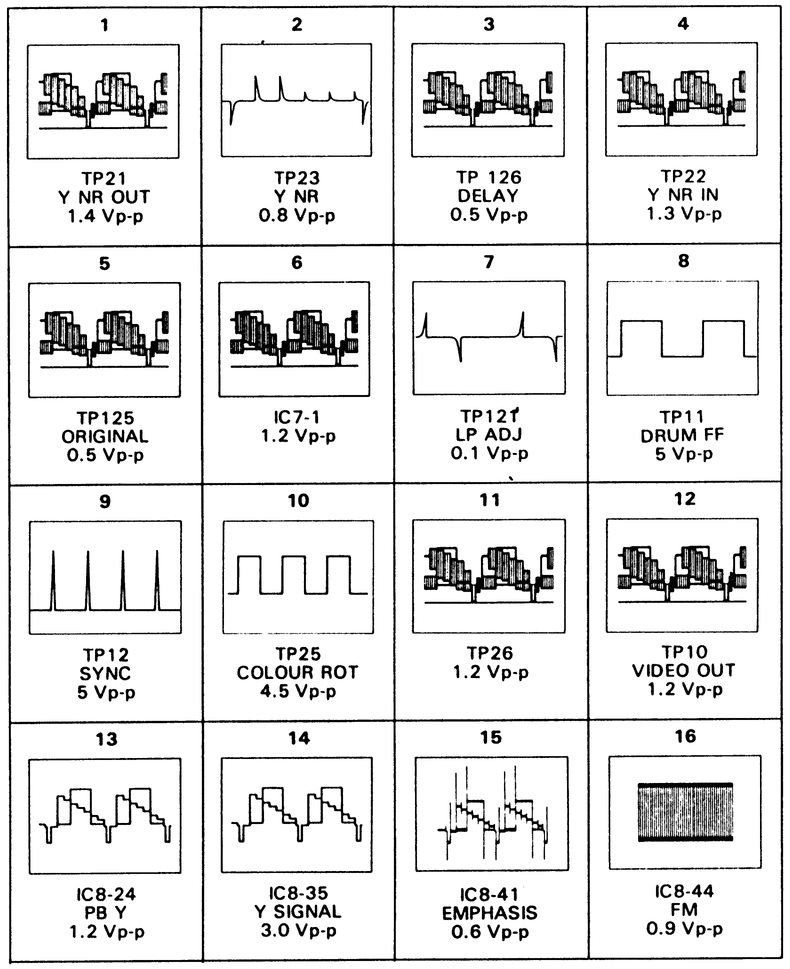
0 2 Video-Schaltung
Video Schematic Diagram

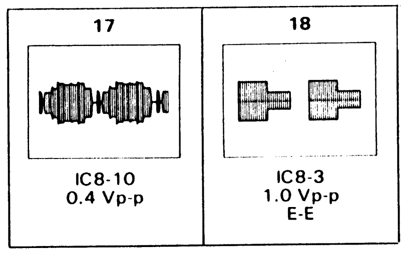

02 VIDEO -Luminance Section- (V/A/F)
Q1 2SC1740S(QRS)
Q2 2SA933S
Q4 2SC1740S(QRS)
Q5 2SA933S
Q6 2SC1740S(QRS)
Q7 2SC2021Q,R,S
TP126 0.5H DELAY
IC1 MSM6967RS
IC2 MSM6989RS
IC3 BA7021
LPF1
DL
0.5H DL
MUT
SELECT
R23 0.5H DELAY
TP125 ORIGINAL VIDEO
TP125
IC4 TA7374P
VCO
PD
Q3 2SC1740S (QRS)
Q11, 12 DTC124EF
Q16,17 DTC144WS
R57 Y NR GAIN
Q8 2SC1740S(QRS)
Q10 DTC144ES
EQ1
IC5 BA225
Q13 2SC1740S (QRS)
TP23 Y NR
TP21 Y NR OUT
Q14 DTC114ES
TP22 Y NR IN
IC6 M51458P
N.R
R45 Y NR BAL
Q15 DTC144WS
IC7 7VT12
DETAIL-ENHANCER
D14, 15 OA90
TP121 LP ADJ
TP11 DRUM FF
TP12 SYNC
Q9 DTC124ES
TP25 COLOUR ROTATION
TP26
From/To 03 SERVO,CN407
CN7
V PULSE
DRUM FF
LP ADJ
GND
SYNC
From/To 35 PRE/REC,CN1
CN5
SYNC
GND
NC
DRUM FF
REC 9V
COLOUR ROT
SECAM
LP 5V
SWD 9V
SWD 5V
DRUM FF
V. SYNC
SYNC
VIDEO
From/To 02 VIDEO (COLOUR)
PB 5V
SHARPNESS CTL
LP
COLOUR ROT
LP 5V
SECAM
REC 9V
From/To 02 VIDEO (COLOUR)
From/To 35 PRE/REC, CN2
CN6
REC FM
GND
PB FM
GND
PB COLOUR
REC COLOUR
REC MUT
SPE
REC MUT
REC COLOUR
PB COLOUR
INSERT
LP SPE
SPECIAL COLOUR
LP SPE
GND
From/To 02 VIDEO (COLOUR)
From 03 TIMER, CN3
CN1
SYNC
GND
CHARACTOR
BACK
GND
PROGRAM
Q18 DTC124ES
Q23,Q24 2SC1740S(QRS)
Q27,Q28 2SC1740S (QRS)
IC9 NJM2207S
CLAMP
TP GND
From/To 06 TERMINAL CN5
CN2
SWD 12V
VIDEO
GND
GND
VIDEO
PB
TP10 VIDEO OUT
VIDEO
VIDEO
FF
PB
SPE
E-E 5V
FSC
From/To 02 VIDEO (COLOUR)
Q25 2SA933S
Q26 2SC1740S(QRS)
Q29, Q30 2SA933S
Q31 2SC1740S (QRS)
EQ2
IC8 PU22282A
NOISE LIMITER
NOISE DET
FM CAR INT CTL
NON LIN EMPH DE EMP
CLAMP
MAIN EMPA
FREQ MOD
SHARPNESS CONTROL
NOISE CANCEL
DOC DET
DELAY
LIMITER
FREQ DEMOD
DOUBLE LIMITER
FREQ DEMOD
SQUELCH
NOISE CANCEL
Y/C MIX
E-E AMP
SUB CLAMP
NON LIN MIX
W/D CLIP
SYNC SEP
DELAY & MIX
PB AMP
KEYED AGC
AGC DET
Q21 2SC2021Q,R,S
Q22 2SC1740S(QRS)
Q20 DTC124EF
LPF2
Q69 DTC124EF

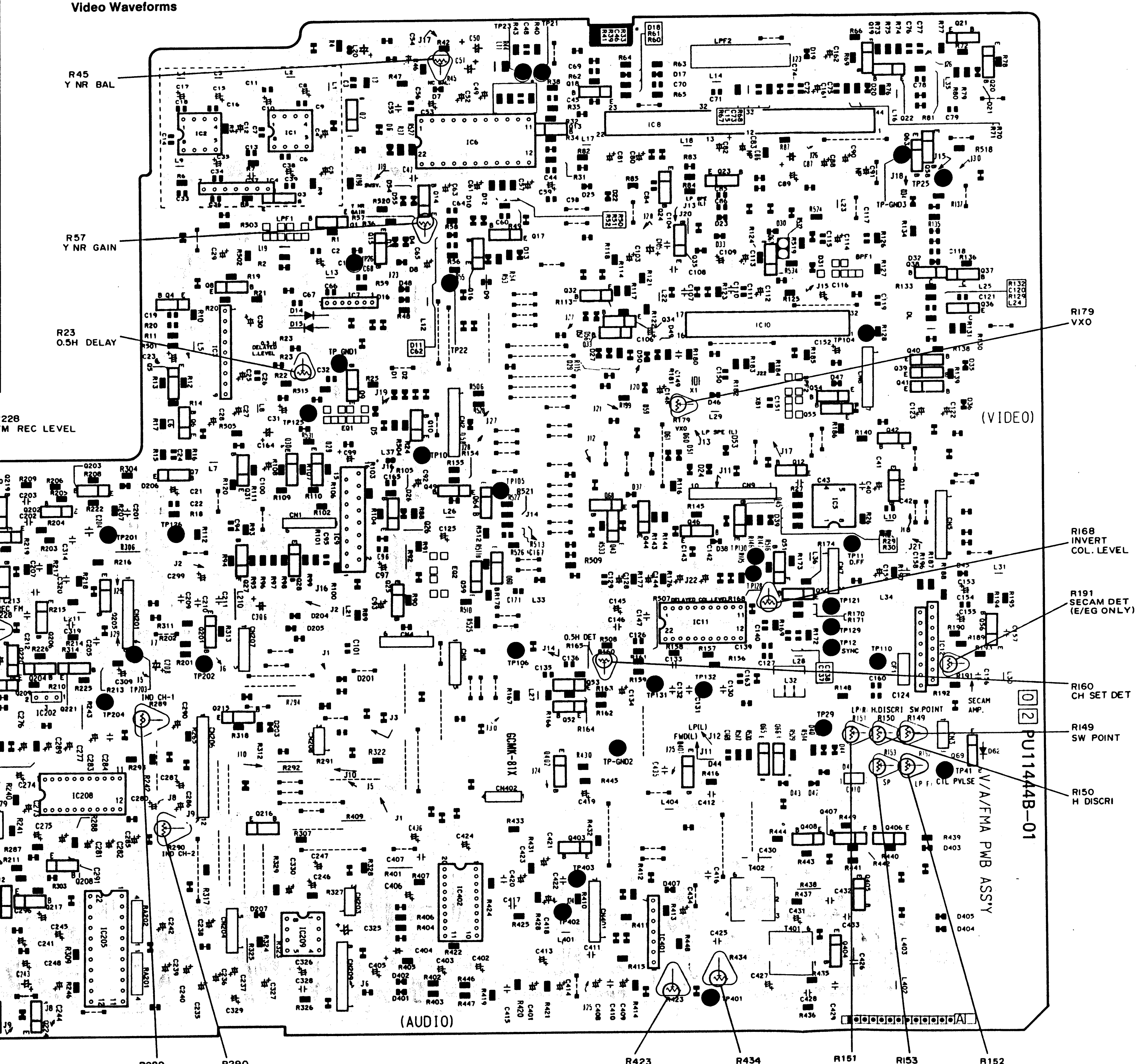
0 2 Video-Platte
Video Circuit Board

Y-Teil
Luminance Section

Video-Oszillogramme
Video Waveforms


1: TP21 Y NR OUT 1.4 Vp-p
2: TP23 Y NR 0.8 Vp-p
3: TP 126 DELAY 0.5 Vp-p
4: TP22 Y NR IN 1.3 Vp-p
5: TP125 ORIGINAL 0.5 Vp-p
6: IC7-1 1.2 Vp-p
7: TP121 LP ADJ 0.1 Vp-p
8: TP11 DRUM FF 5 Vp-p
9: TP12 SYNC 5 Vp-p
10: TP25 COLOUR ROT 4.5 Vp-p
11: TP26 1.2 Vp-p
12: TP10 VIDEO OUT 1.2 Vp-p
13: IC8-24 PB Y 1.2 Vp-p
14: IC8-35 Y SIGNAL 3.0 Vp-p
15: IC8-41 EMPHASIS 0.6 Vp-p
16: IC8-44 FM 0.9 Vp-p

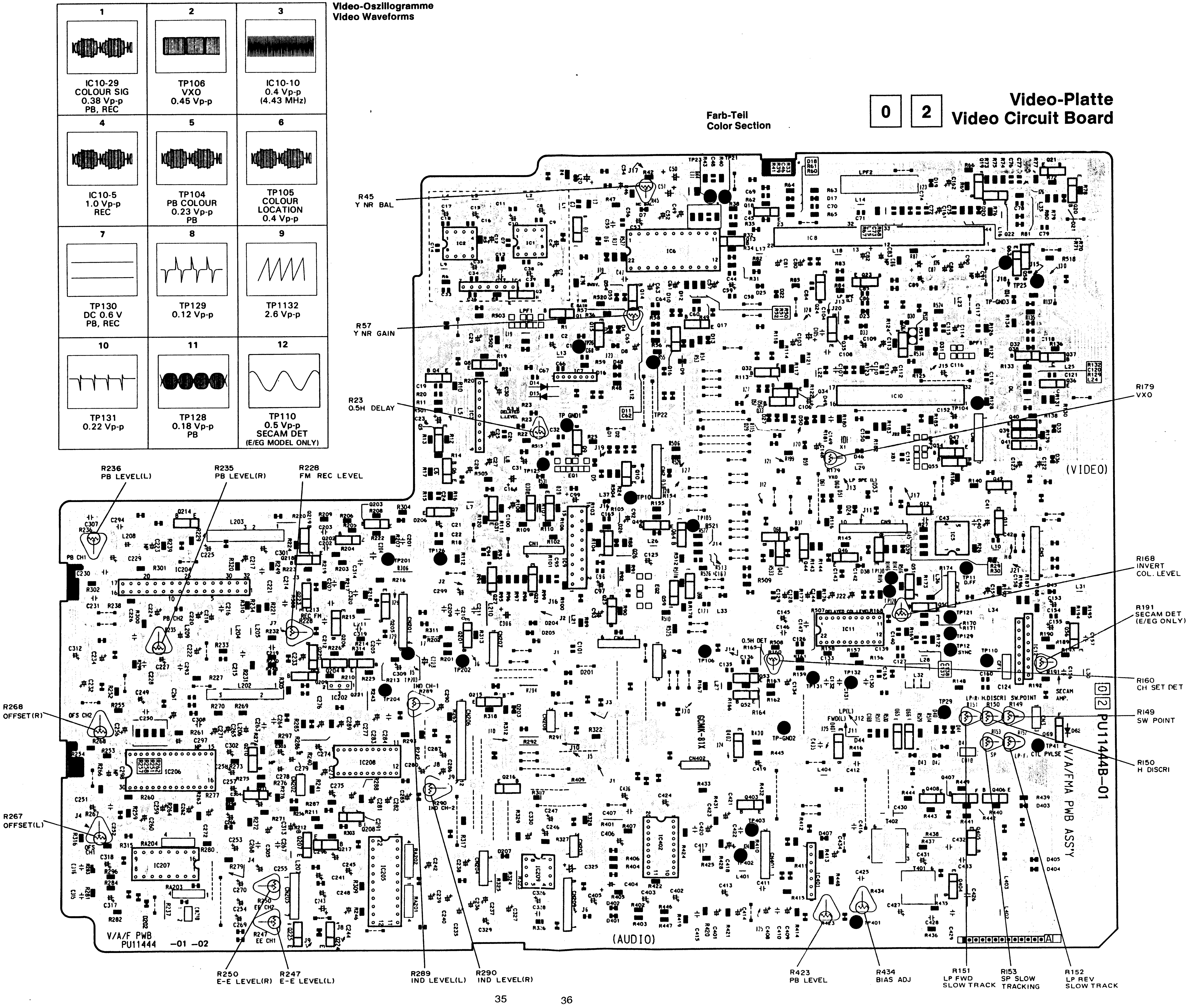

17: IC8-10 0.4 Vp-p
18: IC8-3 1.0 Vp-p E-E


R45 Y NR BAL
R57 Y NR GAIN
R23 0.5H DELAY
R179 VXO
(VIDEO)
R236 PB LEVEL(L)
R235 PB LEVEL(R)
R228 FM REC LEVEL
R168 INVERT COL. LEVEL
R191 SECAM DET (E/EG ONLY)
R160 CH SET DET
R149 SW POINT
R150 H DISCRI
R268 OFFSET(R)
R267 OFFSET(L)
PU11444B-01
V/A/FMA PWB ASSY
V/A/F PWB PU11444 -01 -02
(AUDIO)
R250 E-E LEVEL(R)
R247 E-E LEVEL(L)
R289 IND LEVEL(L)
R290 IND LEVEL(R)
R423 PB LEVEL
R434 BIAS ADJ
R151 LP FWD SLOW TRACK
R153 SP SLOW TRACKING
R152 LP REV SLOW TRACK

Video-Oszillogramme
Video Waveforms

0 2 Video-Platte
Video Circuit Board

Farb-Teil
Color Section



1	2	3
IC10-29 COLOUR SIG 0.38 Vp-p PB, REC	TP106 VXO 0.45 Vp-p	IC10-10 0.4 Vp-p (4.43 MHz)
4	**5**	**6**
IC10-5 1.0 Vp-p REC	TP104 PB COLOUR 0.23 Vp-p PB	TP105 COLOUR LOCATION 0.4 Vp-p PB
7	**8**	**9**
TP130 DC 0.6 V PB, REC	TP129 0.12 Vp-p	TP1132 2.6 Vp-p
10	**11**	**12**
TP131 0.22 Vp-p	TP128 0.18 Vp-p PB	TP110 0.5 Vp-p SECAM DET (E/EG MODEL ONLY)

R45
Y NR BAL
R57
Y NR GAIN
R23
0.5H DELAY
R179
VXO
(VIDEO)
R168
INVERT
COL. LEVEL
R191
SECAM DET
(E/EG ONLY)
R160
CH SET DET
R149
SW POINT
R150
H DISCRI
PU11444B-01
V/A/FMA PWB ASSY
R236
PB LEVEL(L)
R235
PB LEVEL(R)
R228
FM REC LEVEL
R268
OFFSET(R)
R267
OFFSET(L)
V/A/F PWB
PU11444 -01 -02
(AUDIO)
R250
E-E LEVEL(R)
R247
E-E LEVEL(L)
R289
IND LEVEL(L)
R290
IND LEVEL(R)
R423
PB LEVEL
R434
BIAS ADJ
R151
LP FWD
SLOW TRACK
R153
SP SLOW
TRACKING
R152
LP REV
SLOW TRACK

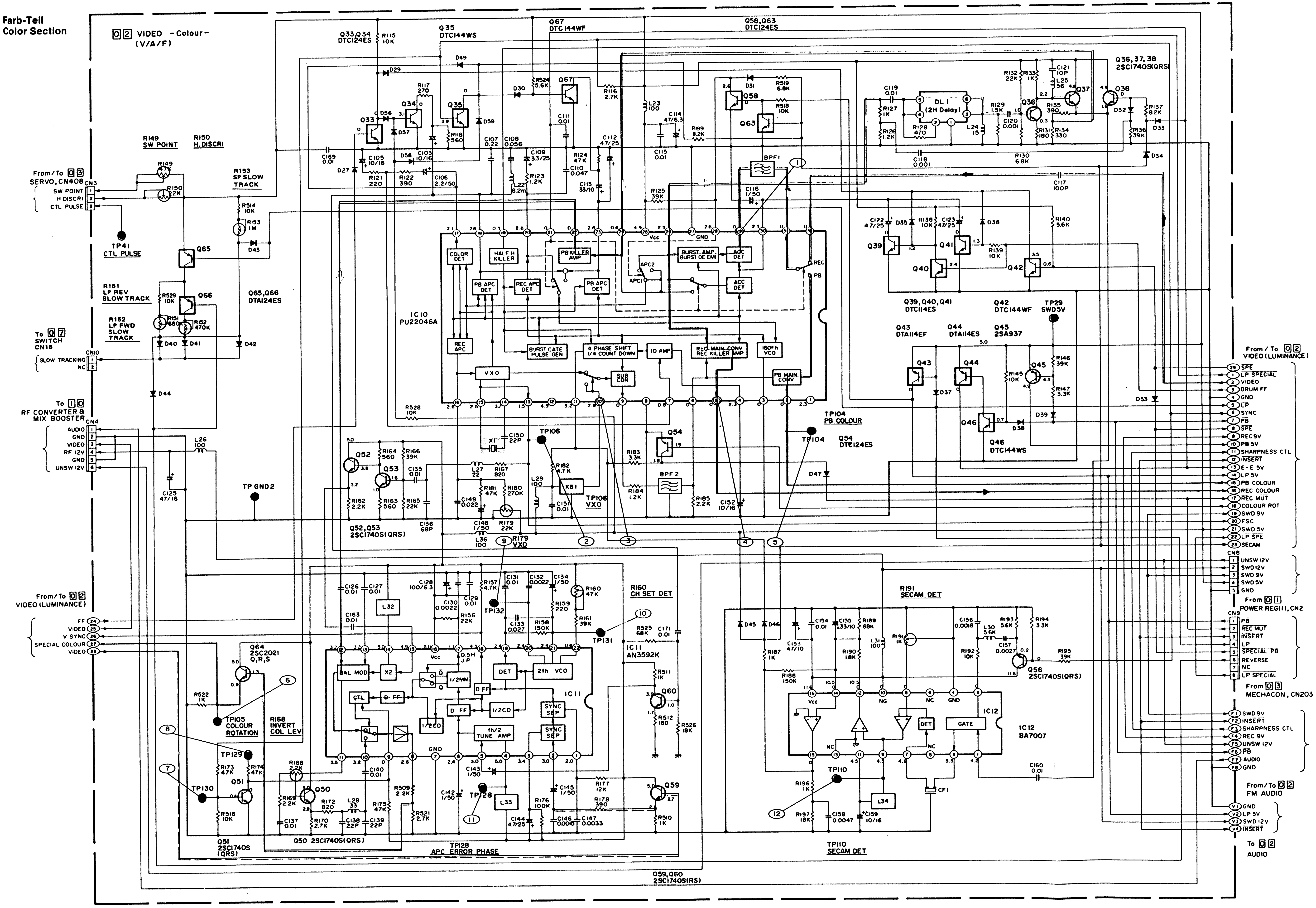
0 2 Video-Schaltung
Video Schematic Diagramm

NOTES:
1. Shaded (■) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during PLAY BACK mode.

▨ Grau unterlegte Bauteile sind Sicherheitsbauteile und dürfen nur durch Originalteile ersetzt werden!

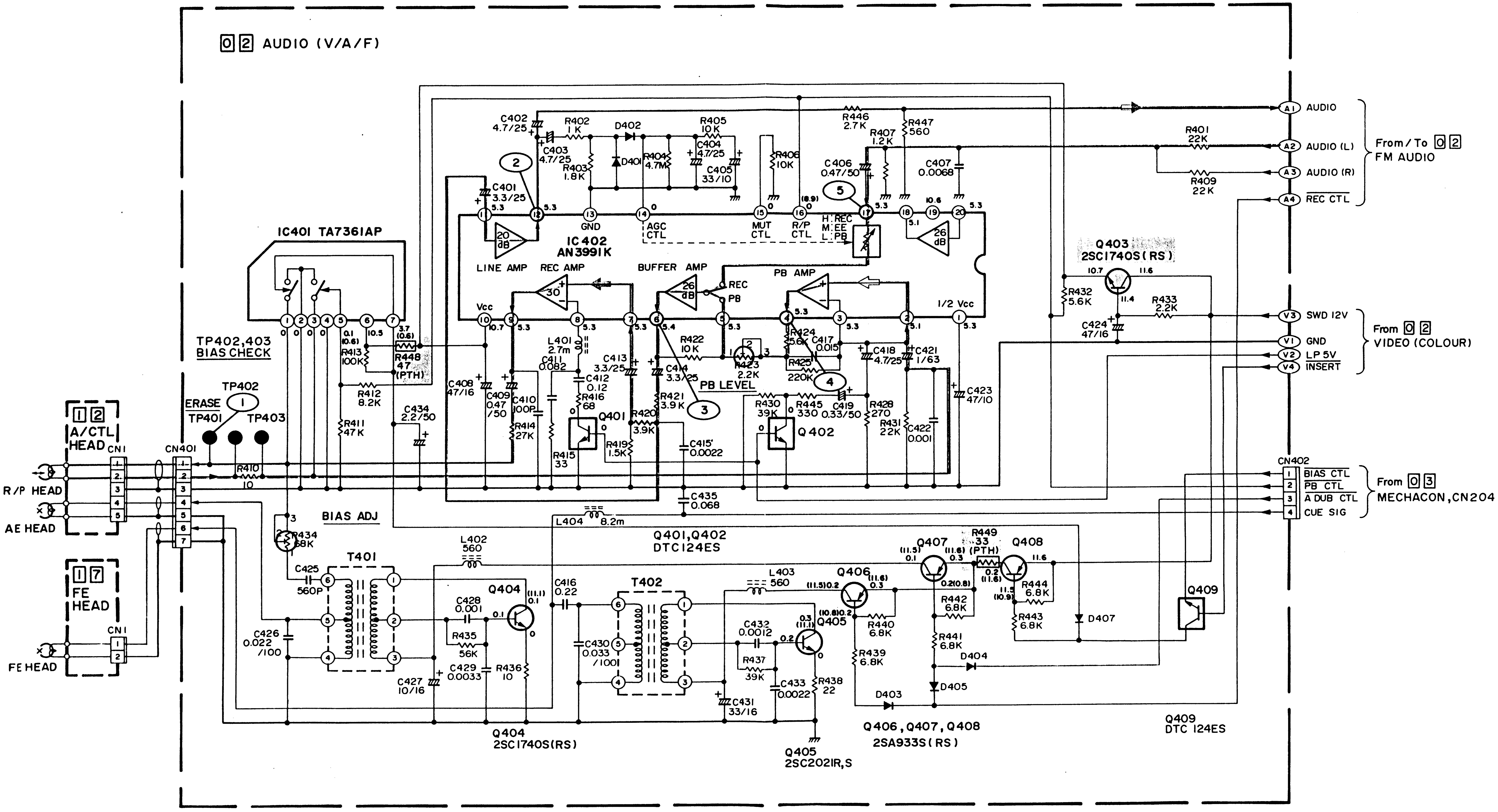
Alle Gleichspannungen sind mit einem Digitalvoltmeter im Wiedergabe-Betrieb gemessen.

Farb-Teil
Color Section



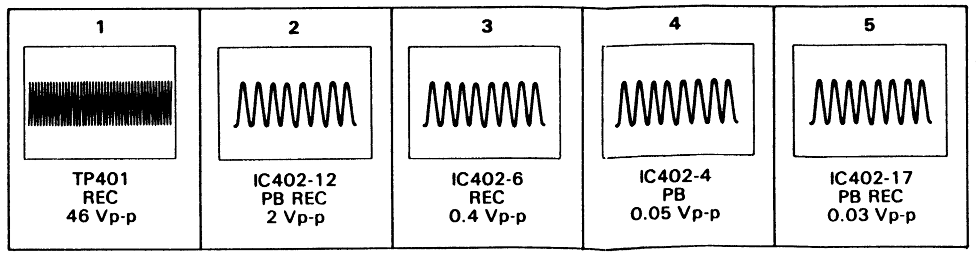
02 VIDEO -Colour- (V/A/F)
From/To 03 SERVO, CN408
CN3
SW POINT
H DISCRI
CTL PULSE
TP41 CTL PULSE
R149 SW POINT
R150 H.DISCRI
R153 SP SLOW TRACK
R151 LP REV SLOW TRACK
R152 LP FWD SLOW TRACK
Q65
Q66
Q65,Q66 DTA124ES
To 07 SWITCH CN18
CN10
SLOW TRACKING
NC
To 10 RF CONVERTER & MIX BOOSTER
CN4
AUDIO
GND
VIDEO
RF 12V
GND
UNSW 12V
TP GND2
Q33,Q34 DTC124ES
Q35 DTC144WS
Q67 DTC144WF
Q58,Q63 DTC124ES
Q36, 37, 38 2SC1740S(QRS)
DL1 (2H Delay)
BPF1
BPF 2
IC10 PU22046A
COLOR DET
HALF H KILLER
PB KILLER AMP
BURST AMP BURST DE EMI
ACC DET
PB APC DET
REC APC DET
APC2
APC1
REC APC
BURST GATE PULSE GEN
4 PHASE SHIFT 1/4 COUNT DOWN
ID AMP
REC MAIN CONV REC KILLER AMP
160fH VCO
VXO
SUB CON
PB MAIN CONV
REC
PB
Vcc
GND
Q39
Q40
Q41
Q42
Q39,Q40,Q41 DTC114ES
Q42 DTC144WF
TP29 SWD5V
Q43 DTA114EF
Q44 DTA114ES
Q45 2SA937
Q46 DTC144WS
TP104 PB COLOUR
Q54 DTC124ES
Q52
Q53
Q52,Q53 2SC1740S(QRS)
TP106
TP106 VXO
X1
XB1
R179 VXO
From/To 02 VIDEO (LUMINANCE)
SPE
LP SPECIAL
VIDEO
DRUM FF
GND
LP
SYNC
PB
SPE
REC 9V
PB 5V
SHARPNESS CTL
INSERT
E-E 5V
LP 5V
PB COLOUR
REC COLOUR
REC MUT
COLOUR ROT
SWD 9V
FSC
SWD 5V
LP SPE
SECAM
CN8
UNSW 12V
SWD12V
SWD 9V
SWD5V
GND
From 01 POWER REG(1), CN2
CN9
PB
REC MUT
INSERT
LP
SPECIAL PB
REVERSE
NC
LP SPECIAL
From 03 MECHACON, CN203
SWD 9V
INSERT
SHARPNESS CTL
REC 9V
UNSW 12V
PB
AUDIO
GND
From/To 02 FM AUDIO
GND
LP 5V
SWD 12V
INSERT
To 02 AUDIO
From/To 02 VIDEO (LUMINANCE)
FF
VIDEO
V SYNC
SPECIAL COLOUR
VIDEO
Q64 2SC2021 Q,R,S
TP105 COLOUR ROTATION
R168 INVERT COL LEV
TP129
TP130
Q51
Q51 2SC1740S (QRS)
Q50
Q50 2SC1740S(QRS)
TP132
TP128
TP128 APC ERROR PHASE
IC11 AN3592K
BAL MOD
X2
1/2MM
DET
2fH VCO
CTL
D FF
1/2CD
SYNC SEP
fH/2 TUNE AMP
TP131
R160 CH SET DET
Q60
Q59
Q59,Q60 2SC1740S(RS)
R191 SECAM DET
Q56 2SC1740S(QRS)
IC12 BA7007
GATE
NG
NC
CF1
L34
TP110
TP110 SECAM DET

0 2 Audio-Schaltung
Audio Schematic Diagram



02 AUDIO (V/A/F)
IC401 TA7361AP
IC402 AN3991K
LINE AMP
REC AMP
BUFFER AMP
PB AMP
GND
AGC CTL
MUT CTL
R/P CTL
H: REC M: EE L: PB
1/2 Vcc
Vcc
20 dB
30
26 dB
REC
PB
TP402,403 BIAS CHECK
TP402
ERASE TP401
TP403
BIAS ADJ
PB LEVEL
C401 3.3/25
C402 4.7/25
C403 4.7/25
C404 4.7/25
C405 33/10
C406 0.47/50
C407 0.0068
C408 47/16
C409 0.47/50
C410 100P
C411 0.082
C412 0.12
C413 3.3/25
C414 3.3/25
C415' 0.0022
C416 0.22
C417 0.015
C418 4.7/25
C419 0.33/50
C421 1/63
C422 0.001
C423 47/10
C424 47/16
C425 560P
C426 0.022/100
C427 10/16
C428 0.001
C429 0.0033
C430 0.033/100
C431 33/16
C432 0.0012
C433 0.0022
C434 2.2/50
C435 0.068
R401 22K
R402 1K
R403 1.8K
R404 4.7M
R405 10K
R406 10K
R407 1.2K
R409 22K
R410 10
R411 47K
R412 8.2K
R413 100K
R414 27K
R415 33
R416 68
R419 1.5K
R420 3.9K
R421 3.9K
R422 10K
R423 2.2K
R424 5.6K
R425 220K
R428 270
R430 39K
R431 22K
R432 5.6K
R433 2.2K
R434 68K
R435 56K
R436 10
R437 39K
R438 22
R439 6.8K
R440 6.8K
R441 6.8K
R442 6.8K
R443 6.8K
R444 6.8K
R445 330
R446 2.7K
R447 560
R448 47 (PTH)
R449 33 (PTH)
D401
D402
D403
D404
D405
D407
L401 2.7m
L402 560
L403 560
L404 8.2m
T401
T402
Q401
Q402
Q403 2SC1740S(RS)
Q404
Q405
Q406
Q407
Q408
Q409
Q401,Q402 DTC124ES
Q404 2SC1740S(RS)
Q405 2SC2021R,S
Q406,Q407,Q408 2SA933S(RS)
Q409 DTC124ES
① ② ③ ④ ⑤
12 A/CTL HEAD
CN1
R/P HEAD
AE HEAD
17 FE HEAD
FE HEAD
CN401
CN402
A1 AUDIO
A2 AUDIO (L)
A3 AUDIO (R)
A4 REC CTL
From/To 02 FM AUDIO
V3 SWD 12V
V1 GND
V2 LP 5V
V4 INSERT
From 02 VIDEO (COLOUR)
1 BIAS CTL
2 PB CTL
3 A DUB CTL
4 CUE SIG
From 03 MECHACON,CN204

Audio-Oszillogramme
Audio Waveforms

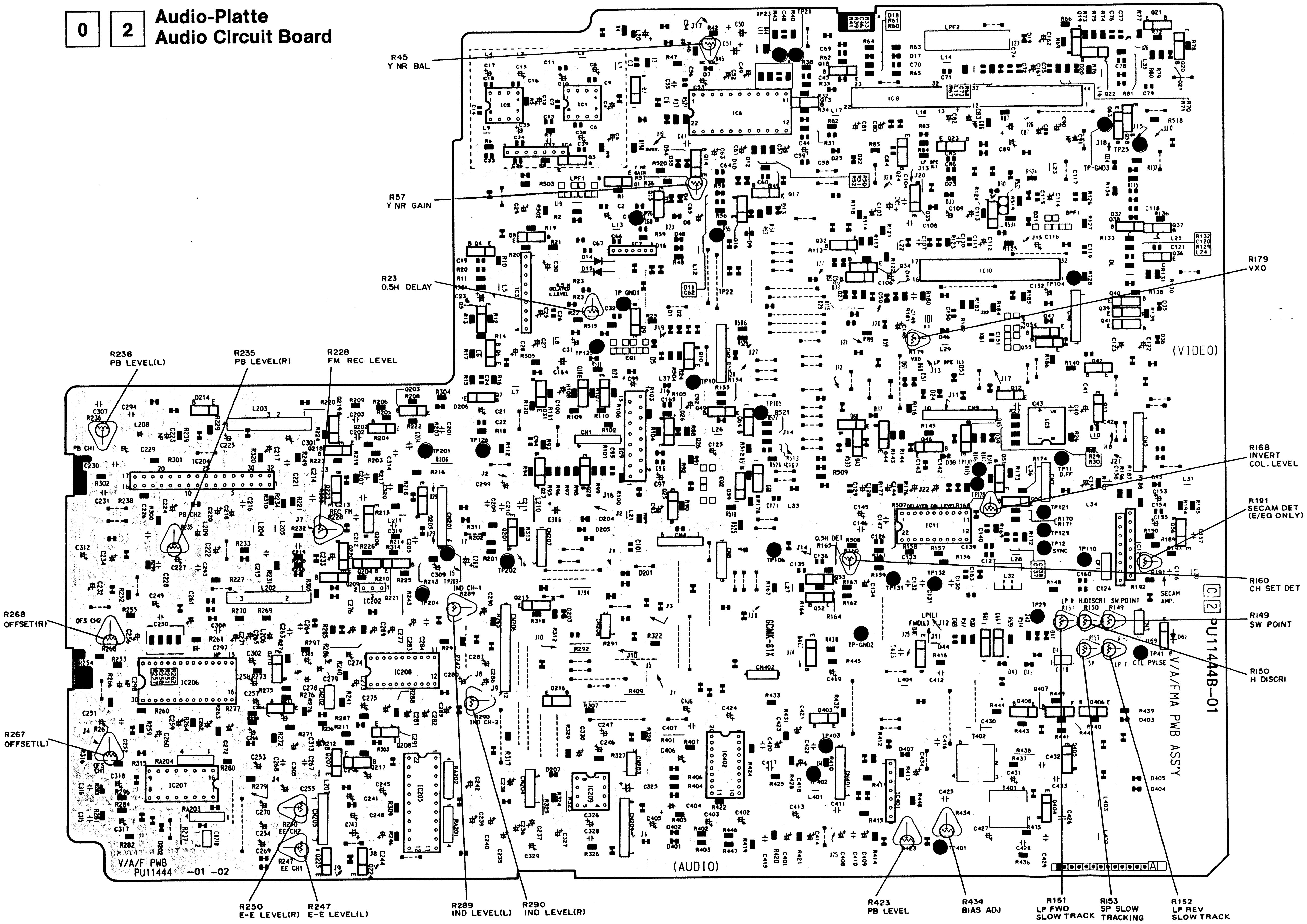


NOTES:

1. Shaded (▬) parts are critical for safety. Replace only with specified part numbers.

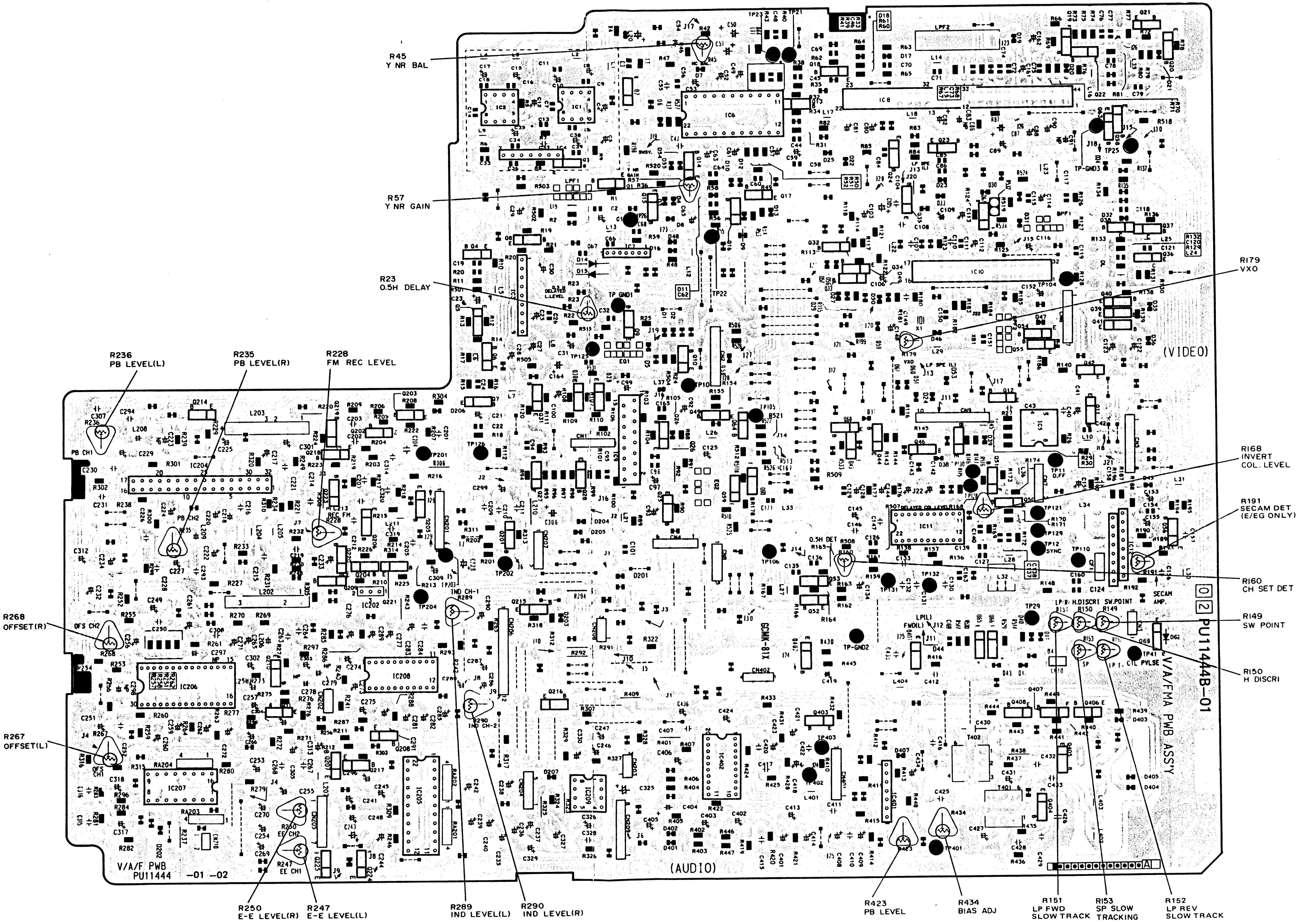
▨ Grau unterlegte Bauteile sind Sicherheitsbauteile und dürfen nur durch Originalteile ersetzt werden!

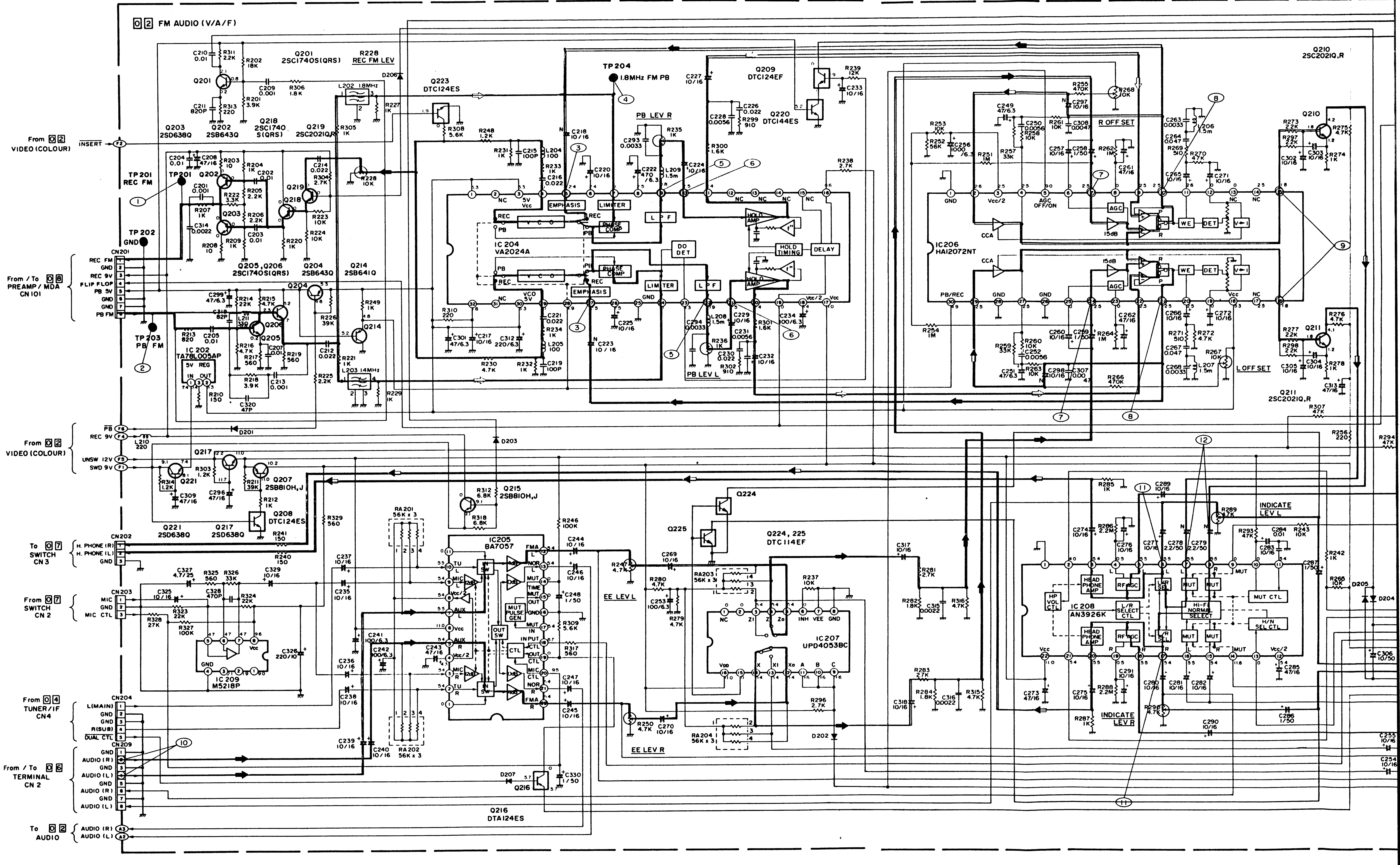
0 2 Audio-Platte
Audio Circuit Board


R45
Y NR BAL
R57
Y NR GAIN
R23
0.5H DELAY
R236
PB LEVEL(L)
R235
PB LEVEL(R)
R228
FM REC LEVEL
R179
VXO
(VIDEO)
R168
INVERT
COL. LEVEL
R191
SECAM DET
(E/EG ONLY)
R160
CH SET DET
R149
SW POINT
R150
H DISCRI
R268
OFFSET(R)
R267
OFFSET(L)
V/A/F PWB
PU11444 -01 -02
PU11444B-01
V/A/FMA PWB ASS'Y
(AUDIO)
R250
E-E LEVEL(R)
R247
E-E LEVEL(L)
R289
IND LEVEL(L)
R290
IND LEVEL(R)
R423
PB LEVEL
R434
BIAS ADJ
R151
LP FWD
SLOW TRACK
R153
SP SLOW
TRACKING
R152
LP REV
SLOW TRACK

0 2

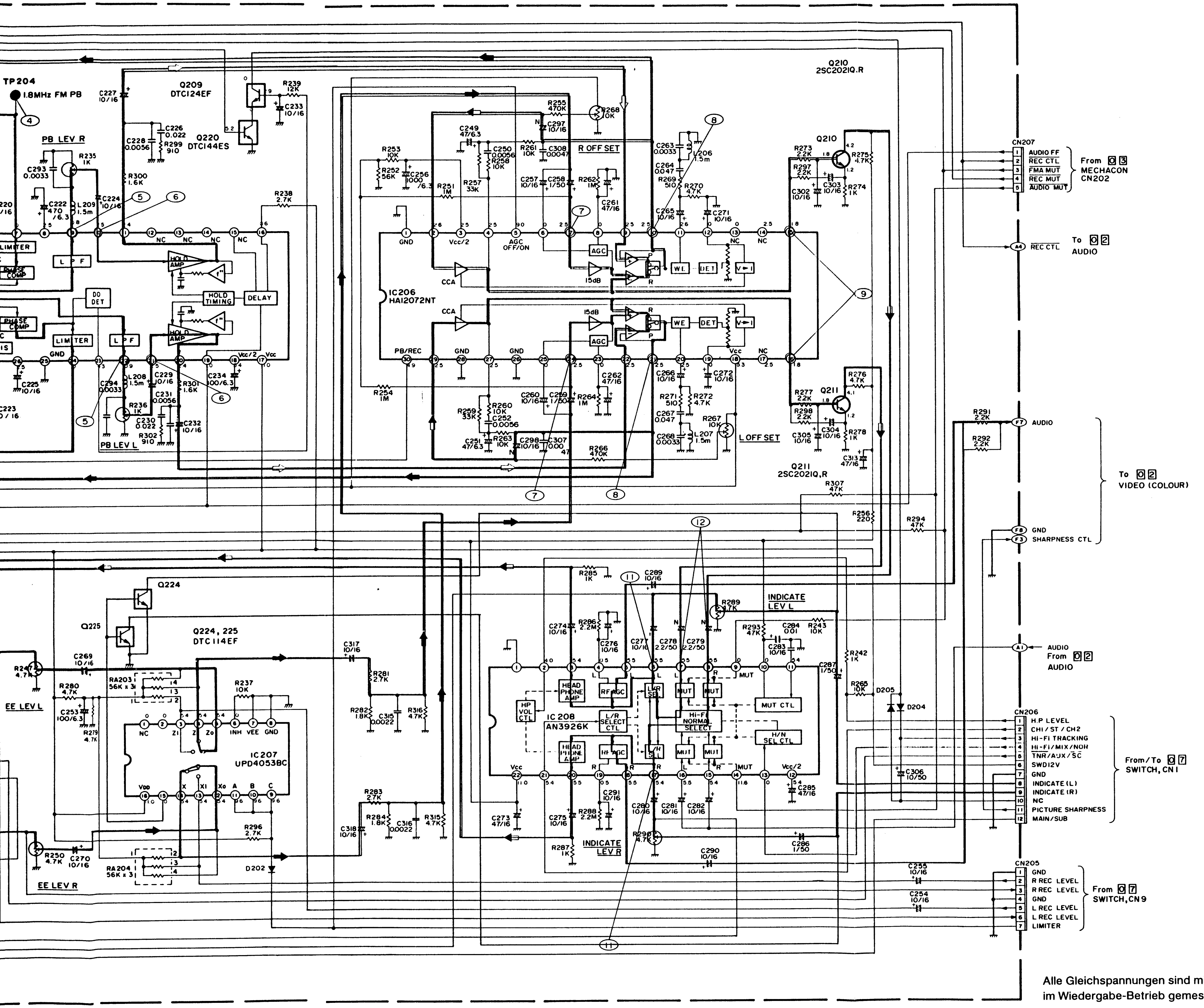
FM Audio-Platte
FM Audio Circuit Board


R45
Y NR BAL
R57
Y NR GAIN
R23
0.5H DELAY
R236
PB LEVEL(L)
R235
PB LEVEL(R)
R228
FM REC LEVEL
R179
VXO
R168
INVERT
COL. LEVEL
R191
SECAM DET
(E/EG ONLY)
R160
CH SET DET
R149
SW POINT
R150
H DISCRI
R268
OFFSET(R)
R267
OFFSET(L)
(VIDEO)
(AUDIO)
V/A/F PWB
PU11444 -01 -02
02
PU11444B-01
V/A/FMA PWB ASSY
R250
E-E LEVEL(R)
R247
E-E LEVEL(L)
R289
IND LEVEL(L)
R290
IND LEVEL(R)
R423
PB LEVEL
R434
BIAS ADJ
R151
LP FWD
SLOW TRACK
R153
SP SLOW
TRACKING
R152
LP REV
SLOW TRACK

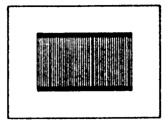
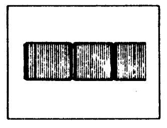
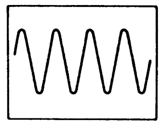
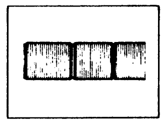
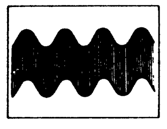
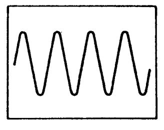
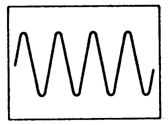
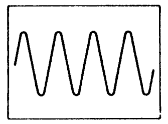
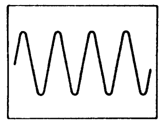
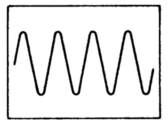
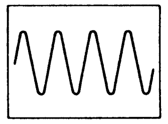
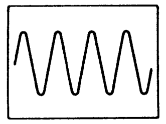

02 FM AUDIO (V/A/F)
From 02 VIDEO (COLOUR)
INSERT
TP201 REC FM
TP202 GND
TP203 PB FM
TP204 1.8MHz FM PB
From / To 08 PREAMP / MDA CN101
REC FM
GND
REC 9V
FLIP FLOP
PB 5V
GND
GND
PB FM
CN201
From 02 VIDEO (COLOUR)
PB
REC 9V
UNSW 12V
SWD 9V
To 07 SWITCH CN3
H. PHONE (R)
H. PHONE (L)
GND
CN202
From 07 SWITCH CN2
MIC
GND
MIC CTL
CN203
From 04 TUNER/IF CN4
L(MAIN)
GND
GND
R(SUB)
DUAL CTL
CN204
From / To 06 TERMINAL CN2
AUDIO (R)
AUDIO (L)
CN209
To 02 AUDIO
AUDIO (R)
AUDIO (L)
Q201 2SC1740S(QRS)
R228 REC FM LEV
Q223 DTC124ES
Q203 2SD638Q
Q202 2SB643Q
Q218 2SC1740 S(QRS)
Q219 2SC2021Q,R
Q205, Q206 2SC1740S(QRS)
Q204 2SB643Q
Q214 2SB641Q
IC202 TA78L005AP
5V REG
L202 1.8MHz
L203 1.4MHz
IC204 VA2024A
EMPHASIS
LIMITER
PHASE COMP
VCO
REC
PB
LPF
DO DET
HOLD AMP
HOLD TIMING
DELAY
PB LEV R
PB LEV L
Q209 DTC124EF
Q220 DTC144ES
IC206 HA12072NT
GND
Vcc/2
AGC OFF/ON
CCA
AGC
15dB
WE
DET
PB/REC
R OFF SET
L OFF SET
Q210 2SC2021Q,R
Q211 2SC2021Q,R
Q217
Q221
Q207 2SB810H,J
Q208 DTC124ES
Q221 2SD638Q
Q217 2SD638Q
Q215 2SB810H,J
IC205 BA7057
TU
MIC
AUX
OUT SW
CTL
MUT PULSE GEN
TIME MUT
FMA
NOR
RA201 56K x 3
RA202 56K x 3
IC209 M5218P
Q216 DTA124ES
EE LEV L
EE LEV R
Q224
Q225
Q224, 225 DTC114EF
RA203 56K x 3
RA204 56K x 3
IC207 UPD4053BC
IC208 AN3926K
HP VOL CTL
HEAD PHONE AMP
RF AGC
L/R SEL
L/R SELECT CTL
MUT
HI-FI NORMAL SELECT
MUT CTL
H/N SEL CTL
INDICATE LEV L
INDICATE LEV R
D201
D202
D203
D204
D205
D206
D207

0 2

FM Audio-Schaltung
FM Audio Schematic Diagram


TP204
1.8MHz FM PB
Q209 DTC124EF
Q220 DTC144ES
PB LEV R
PB LEV L
LIMITER
PHASE COMP
HOLD AMP
HOLD TIMING
DELAY
DO DET
LPF
IC206 HA12072NT
CCA
AGC
R OFF SET
L OFF SET
GND
Vcc/2
AGC OFF/ON
PB/REC
WL
DET
V↔I
WE
Q210 2SC2021Q.R
Q211 2SC2021Q.R
CN207
AUDIO FF
REC CTL
FMA MUT
REC MUT
AUDIO MUT
From 03 MECHACON CN202
REC CTL
To 02 AUDIO
AUDIO
To 02 VIDEO (COLOUR)
GND
SHARPNESS CTL
Q224
Q225
Q224, 225 DTC114EF
EE LEV L
EE LEV R
IC207 UPD4053BC
IC208 AN3926K
HEAD PHONE AMP
HP VOL CTL
RF AGC
L/R SELECT CTL
L/R SEL
MUT
HI-FI NORMAL SELECT
MUT CTL
H/N SEL CTL
INDICATE LEV L
INDICATE LEV R
AUDIO IN
From 02 AUDIO
CN206
H.P LEVEL
CH1/ST/CH2
HI-FI TRACKING
HI-FI/MIX/NOR
TNR/AUX/SC
SWD12V
GND
INDICATE (L)
INDICATE (R)
NC
PICTURE SHARPNESS
MAIN/SUB
From/To 07 SWITCH, CN1
CN205
GND
R REC LEVEL
R REC LEVEL
GND
L REC LEVEL
L REC LEVEL
LIMITER
From 07 SWITCH, CN9
D202
D204
D205

FM Audio-Oszillogramme
FM Audio Waveforms

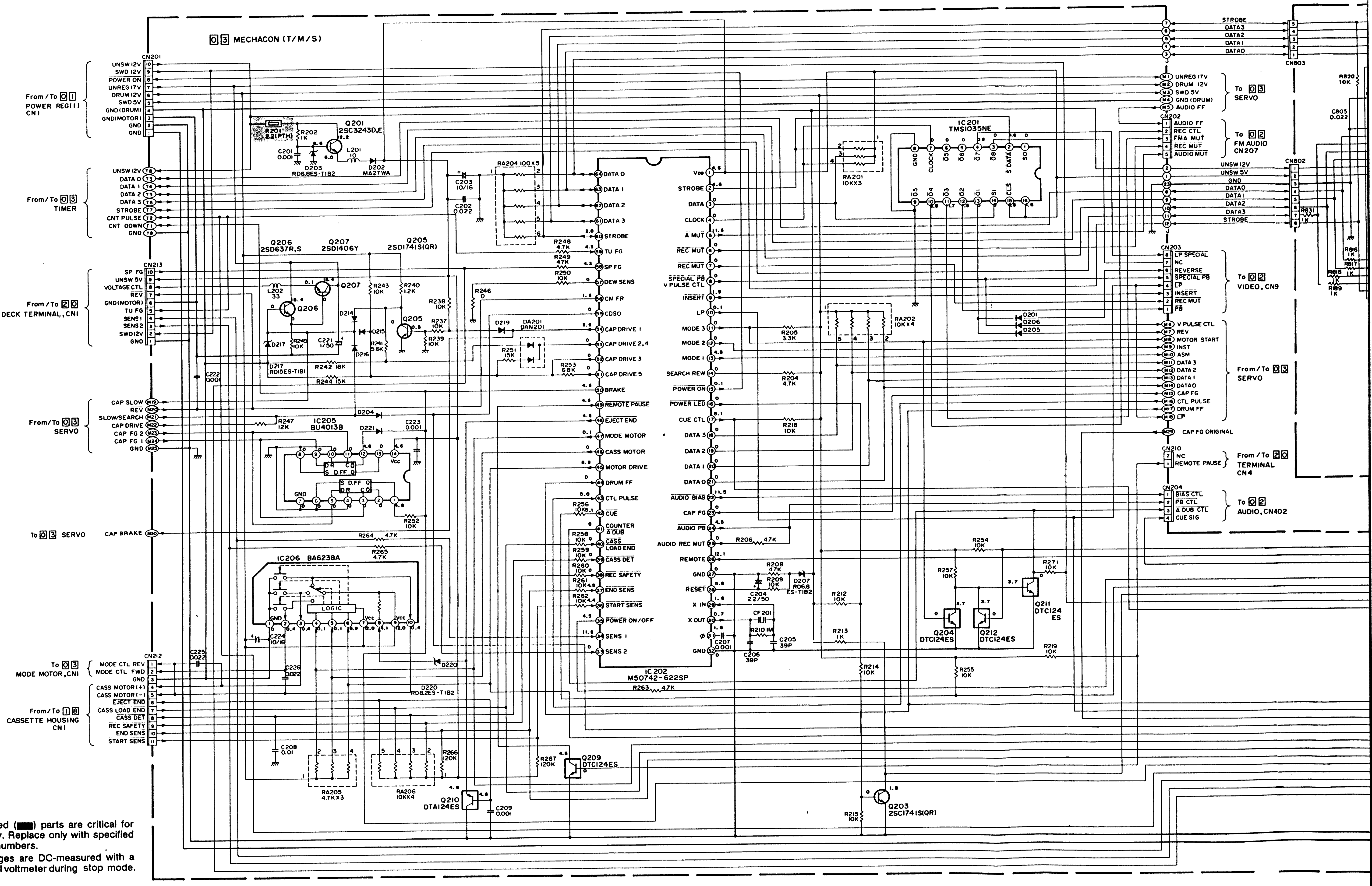
1	2	3
 TP201 REC 2.1 Vp-p	 TP203 PB 0.2 Vp-p	 IC204-5,27 REC 0.42 Vp-p
4	**5**	**6**
 TP204 PB 0.02 Vp-p	 IC204-9,22 PB 0.3 Vp-p	 IC204-10,21 PB 0.05 Vp-p
7	**8**	**9**
 IC206-7,24 REC 0.04 Vp-p	 IC206,10,21 REC 0.4 Vp-p	 IC206-15,16 REC 0.2 Vp-p
10	**11**	**12**
 CN209-2,4 AUDIO IN 0.2 Vp-p	 IC208-6,17 REC 1.2 Vp-p	 IC208-7,8 0.4 Vp-p

Alle Gleichspannungen sind mit einem Digitalvoltmeter im Wiedergabe-Betrieb gemessen.

NOTE:

Voltages are DC-measured with a digital voltmeter during PLAY BACK mode.

0 3 Ablaufsteuerungs-Schaltung
Mechanism Control Schematic Diagram


03 MECHACON (T/M/S)
From/To 01 POWER REG(1) CN1
CN201
UNSW 12V
SWD 12V
POWER ON
UNREG 17V
DRUM 12V
SWD 5V
GND (DRUM)
GND (MOTOR)
GND
From/To 03 TIMER
UNSW 12V
DATA 0
DATA 1
DATA 2
DATA 3
STROBE
CNT PULSE
CNT DOWN
From/To 20 DECK TERMINAL, CN1
CN213
SP FG
UNSW 5V
VOLTAGE CTL
REV
GND (MOTOR)
TU FG
SENS 1
SENS 2
SWD 12V
From/To 03 SERVO
CAP SLOW
SLOW/SEARCH
CAP DRIVE
CAP FG 2
CAP FG 1
To 03 SERVO
CAP BRAKE
To 03 MODE MOTOR, CN1
CN212
MODE CTL REV
MODE CTL FWD
From/To 18 CASSETTE HOUSING CN1
CASS MOTOR (+)
CASS MOTOR (-)
EJECT END
CASS LOAD END
CASS DET
REC SAFETY
END SENS
START SENS
R201 2.2 (PTH)
R202 1K
Q201 2SC3243D,E
C201 0.001
D203 RD6.8ES-T1B2
L201 10
D202 MA27WA
RA204 100X5
C203 10/16
C202 0.022
Q206 2SD637R,S
Q207 2SD1406Y
Q205 2SD1741S(QR)
L202 33
R243 10K
R240 12K
R238 10K
R246 0
D214
D215
D216
D217 RD15ES-T1B1
R245 10K
C221 1/50
R241 5.6K
R237 10K
R239 10K
R242 18K
R244 15K
D219
DA201 DAN201
R251 15K
R253 6.8K
R248 4.7K
R249 47K
R250 10K
C222 0.001
D204
R247 12K
IC205 BU4013B
D221
C223 0.001
D.FF
R252 10K
R264 4.7K
R265 4.7K
IC206 BA6238A
LOGIC
C224 10/16
C225 0.022
C226 0.022
D220
D220 RD8.2ES-T1B2
C208 0.01
RA205 4.7KX3
RA206 10KX4
R266 120K
Q210 DTA124ES
C209 0.001
R267 120K
Q209 DTC124ES
IC202 M50742-622SP
R256 10K
R258 10K
R259 10K
R260 10K
R261 10K
R262 10K
R263 4.7K
DATA 0
DATA 1
DATA 2
DATA 3
STROBE
TU FG
SP FG
DEW SENS
CM FR
CDSO
CAP DRIVE 1
CAP DRIVE 2,4
CAP DRIVE 3
CAP DRIVE 5
BRAKE
REMOTE PAUSE
EJECT END
MODE MOTOR
CASS MOTOR
MOTOR DRIVE
DRUM FF
CTL PULSE
CUE
COUNTER A DUB
CASS LOAD END
CASS DET
REC SAFETY
END SENS
START SENS
POWER ON/OFF
SENS 1
SENS 2
VDD
STROBE
DATA
CLOCK
A MUT
REC MUT
REC MUT
SPECIAL PB
V PULSE CTL
INSERT
LP
MODE 3
MODE 2
MODE 1
SEARCH REW
POWER ON
POWER LED
CUE CTL
DATA 3
DATA 2
DATA 1
DATA 0
AUDIO BIAS
CAP FG
AUDIO PB
AUDIO REC MUT
REMOTE
GND
RESET
X IN
X OUT
GND
RA201 10KX3
IC201 TMS1035NE
RA202 10KX4
R205 3.3K
R204 4.7K
R218 10K
R206 4.7K
R208 4.7K
R209 10K
C204 22/50
D207 RD6.8ES-T1B2
CF201
R210 1M
C205 39P
C206 39P
C207 0.001
R212 10K
R213 1K
R214 10K
R215 10K
Q203 2SC1741S(QR)
R254 10K
R257 10K
R271 10K
Q211 DTC124ES
Q204 DTC124ES
Q212 DTC124ES
R219 10K
R255 10K
D201
D206
D205
STROBE
DATA 3
DATA 2
DATA 1
DATA 0
CN803
UNREG 17V
DRUM 12V
SWD 5V
GND (DRUM)
AUDIO FF
To 03 SERVO
CN202
AUDIO FF
REC CTL
FMA MUT
REC MUT
AUDIO MUT
To 02 FM AUDIO CN207
CN802
UNSW 12V
UNSW 5V
GND
DATA 0
DATA 1
DATA 2
DATA 3
STROBE
R831 1K
R820 10K
C805 0.022
R816
R817 1K
R818
R819 1K
CN203
LP SPECIAL
NC
REVERSE
SPECIAL PB
LP
INSERT
REC MUT
PB
To 02 VIDEO, CN9
V PULSE CTL
REV
MOTOR START
INST
ASM
DATA 3
DATA 2
DATA 1
DATA 0
CAP FG
CTL PULSE
DRUM FF
LP
From/To 03 SERVO
CAP FG ORIGINAL
CN210
NC
REMOTE PAUSE
From/To 20 TERMINAL CN4
CN204
BIAS CTL
PB CTL
A DUB CTL
CUE SIG
To 02 AUDIO, CN402

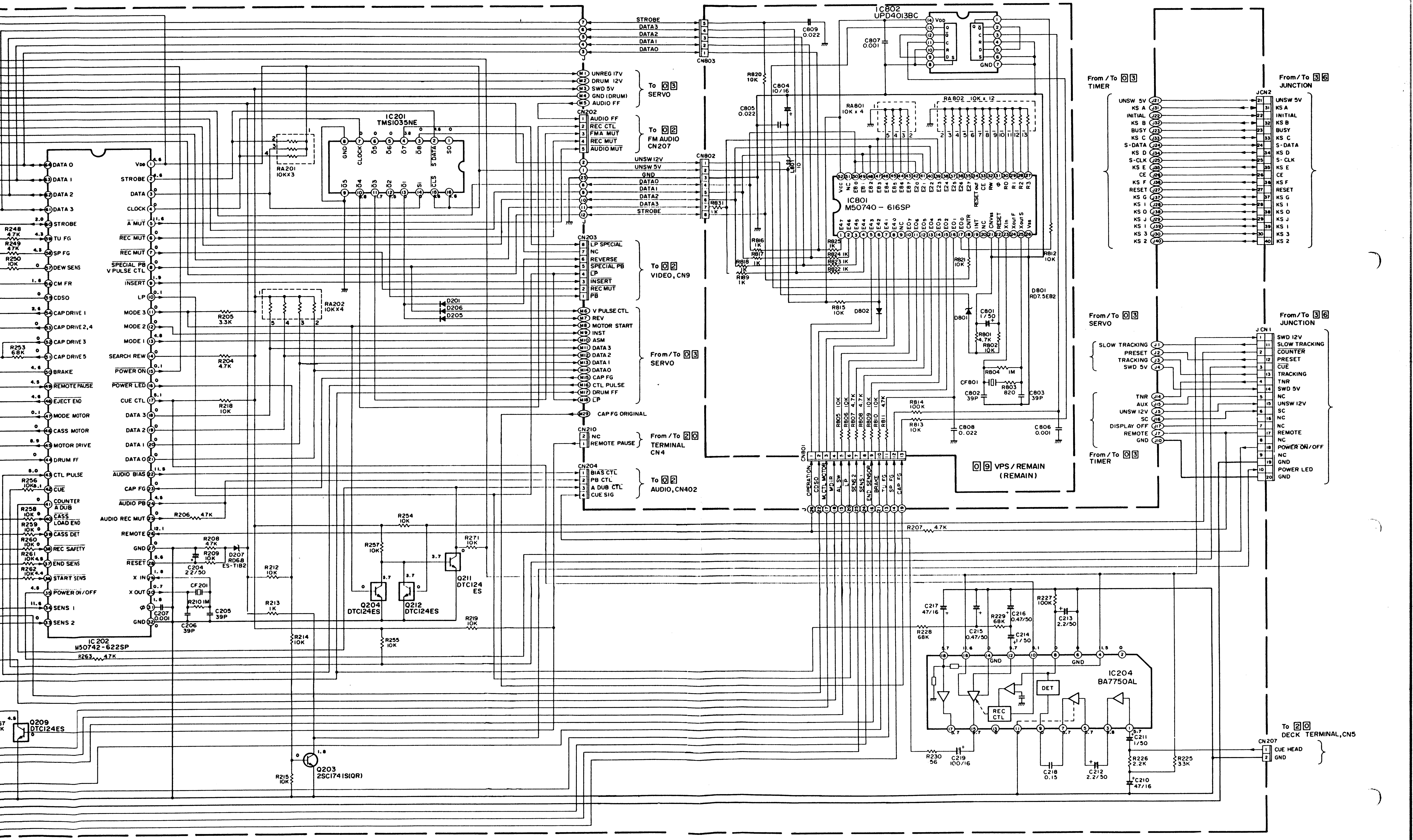
NOTES:

1. Shaded (▬) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during stop mode.

0 3 Ablaufsteuerungs-Schaltung
Mechanism Control Schematic Diagram

Grau unterlegte Bauteile sind Sicherheitsbauteile und dürfen nur durch Originalteile ersetzt werden!

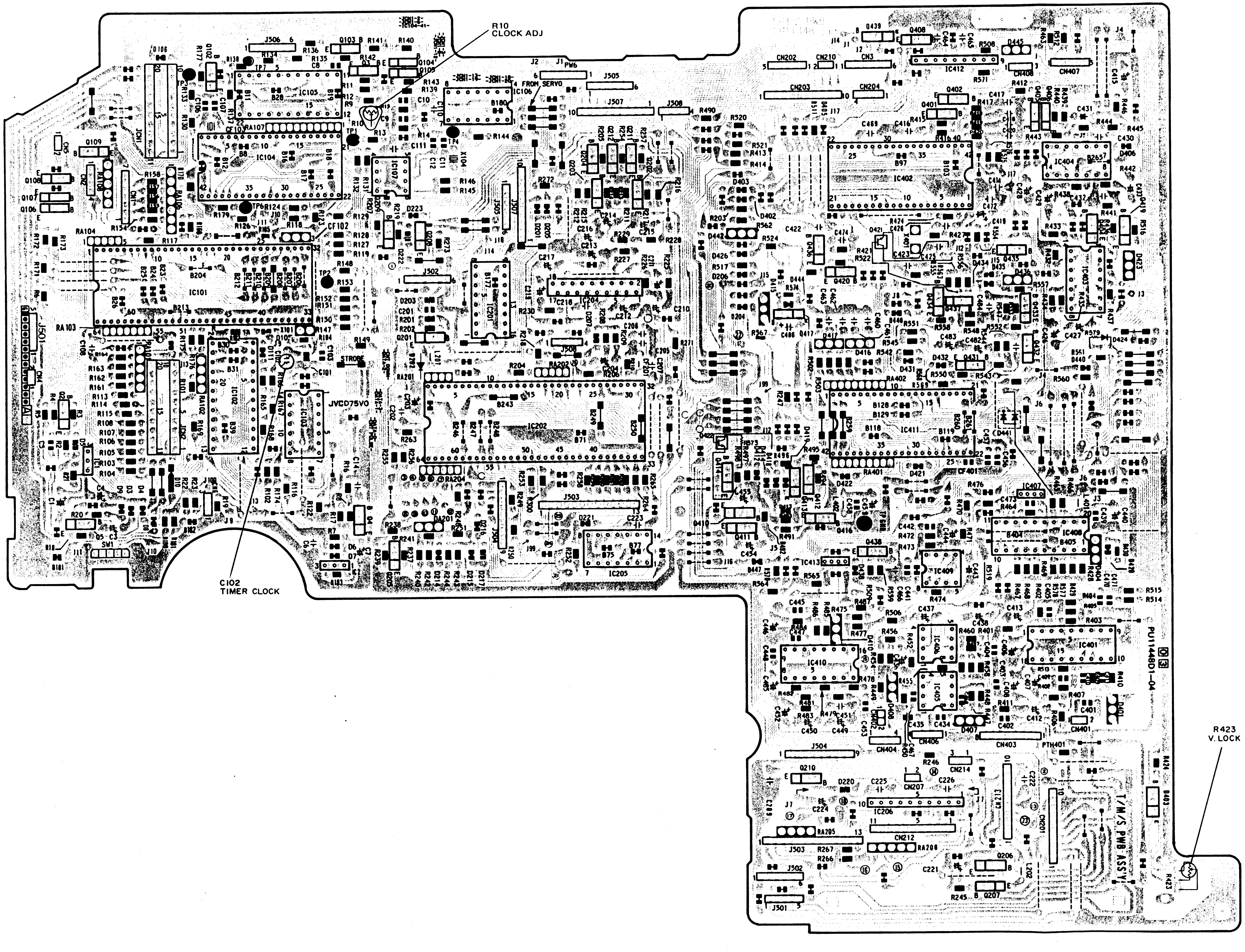
Alle Gleichspannungen sind mit einem Digitalvoltmeter im Stopp-Betrieb gemessen.



IC202
M50742-622SP
DATA 0
DATA 1
DATA 2
DATA 3
STROBE
TU FG
SP FG
DEW SENS
CM FR
CDSO
CAP DRIVE 1
CAP DRIVE 2,4
CAP DRIVE 3
CAP DRIVE 5
BRAKE
REMOTE PAUSE
EJECT END
MODE MOTOR
CASS MOTOR
MOTOR DRIVE
DRUM FF
CTL PULSE
CUE
COUNTER A DUB
CASS LOAD END
CASS DET
REC SAFETY
END SENS
START SENS
POWER ON/OFF
SENS 1
SENS 2
VDD
STROBE
DATA
CLOCK
A MUT
REC MUT
REC MUT
SPECIAL PB V PULSE CTL
INSERT
LP
MODE 3
MODE 2
MODE 1
SEARCH REW
POWER ON
POWER LED
CUE CTL
DATA 3
DATA 2
DATA 1
DATA 0
AUDIO BIAS
CAP FG
AUDIO PB
AUDIO REC MUT
REMOTE
GND
RESET
X IN
X OUT
φ
GND
R248 4.7K
R249 47K
R250 10K
R253 68K
R256 10K
R258 10K
R259 10K
R260 10K
R261 10K
R262 10K
R263 47K
IC201
TMS1035NE
GND
CLOCK
O5
O6
O7
O8
S DATA
SO
RA201 10K×3
RA202 10K×4
D201
D206
D205
R205 3.3K
R204 4.7K
R218 10K
R206 47K
R208 47K
R209 10K
D207 RD6.8 ES-T1B2
C204 22/50
CF201
R210 1M
C205 39P
C206 39P
C207 0.001
R212 10K
R213 1K
R214 10K
R215 10K
R254 10K
R257 10K
R255 10K
R271 10K
R219 10K
Q204 DTC124ES
Q212 DTC124ES
Q211 DTC124 ES
Q209 DTC124ES
Q203 2SC1741S(QR)
STROBE
DATA3
DATA2
DATA1
DATA0
CN803
UNREG 17V
DRUM 12V
SWD 5V
GND (DRUM)
AUDIO FF
To 0 3 SERVO
CN202
AUDIO FF
REC CTL
FMA MUT
REC MUT
AUDIO MUT
To 0 2 FM AUDIO CN207
UNSW 12V
UNSW 5V
GND
DATA0
DATA1
DATA2
DATA3
STROBE
CN802
CN203
LP SPECIAL
NC
REVERSE
SPECIAL PB
LP
INSERT
REC MUT
PB
To 0 2 VIDEO, CN9
V PULSE CTL
REV
MOTOR START
INST
ASM
DATA 3
DATA 2
DATA 1
DATA0
CAP FG
CTL PULSE
DRUM FF
LP
From/To 0 3 SERVO
CAP FG ORIGINAL
CN210
NC
REMOTE PAUSE
From/To 2 0 TERMINAL CN4
CN204
BIAS CTL
PB CTL
A DUB CTL
CUE SIG
To 0 2 AUDIO, CN402
IC802
UPD4013BC
VDD
GND
C809 0.022
C807 0.001
R820 10K
C804 10/16
C805 0.022
RA801 10K×4
RA802 10K×12
L801
R831 1K
IC801
M50740-616SP
R816 1K
R817 1K
R818 1K
R819 1K
R825 1K
R824 1K
R823 1K
R822 1K
R821 10K
R812 10K
R815 10K
D802
D801 RD7.5EB2
C801 1/50
R801 4.7K
R802 10K
R804 1M
R803 820
CF801
C802 39P
C803 39P
R814 100K
R813 10K
C808 0.022
C806 0.001
R805 10K
R806 10K
R807 4.7K
R808 10K
R809 10K
R810 10K
R811 4.7K
CN801
OPERATION
CDSO
M. CTL MOTOR
MD.IR
AL SW
LP
SENS 2
SENS 1
END SENSOR
BRAKE
TU FG
SP FG
CAP FG
0 9 VPS/REMAIN (REMAIN)
From/To 0 3 TIMER
UNSW 5V
KS A
INITIAL
KS B
BUSY
KS C
S-DATA
KS D
S-CLK
KS E
CE
KS F
RESET
KS G
KS I
KS O
KS J
KS 1
KS 3
KS 2
JCN2
From/To 3 6 JUNCTION
From/To 0 3 SERVO
SLOW TRACKING
PRESET
TRACKING
SWD 5V
TNR
AUX
UNSW 12V
SC
DISPLAY OFF
REMOTE
GND
From/To 0 3 TIMER
JCN1
From/To 3 6 JUNCTION
SWD 12V
SLOW TRACKING
COUNTER
PRESET
CUE
TRACKING
TNR
SWD 5V
NC
UNSW 12V
SC
NC
NC
REMOTE
NC
POWER ON/OFF
NC
GND
POWER LED
GND
R207 4.7K
IC204
BA7750AL
DET
REC CTL
C217 47/16
C216 0.47/50
C215 0.47/50
C214 1/50
C213 2.2/50
R227 100K
R229 68K
R228 68K
R230 56
C219 100/16
C218 0.15
C212 2.2/50
C211 1/50
R226 2.2K
R225 33K
C210 47/16
To 2 0 DECK TERMINAL, CN5
CN207
CUE HEAD
GND

0 **3**

Ablaufsteuerungs-Platte
Mechanism Control Circuit Board



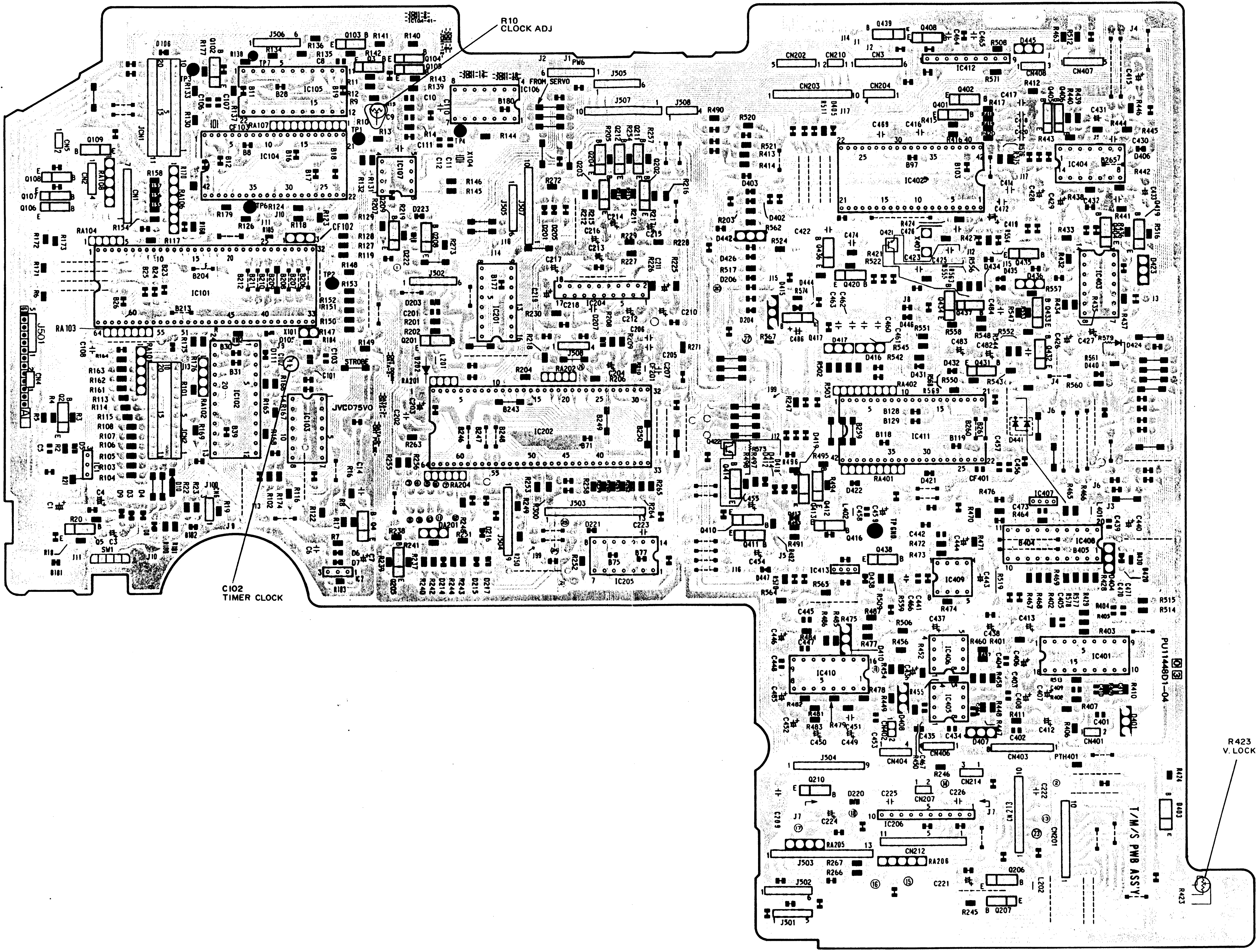
R10
CLOCK ADJ

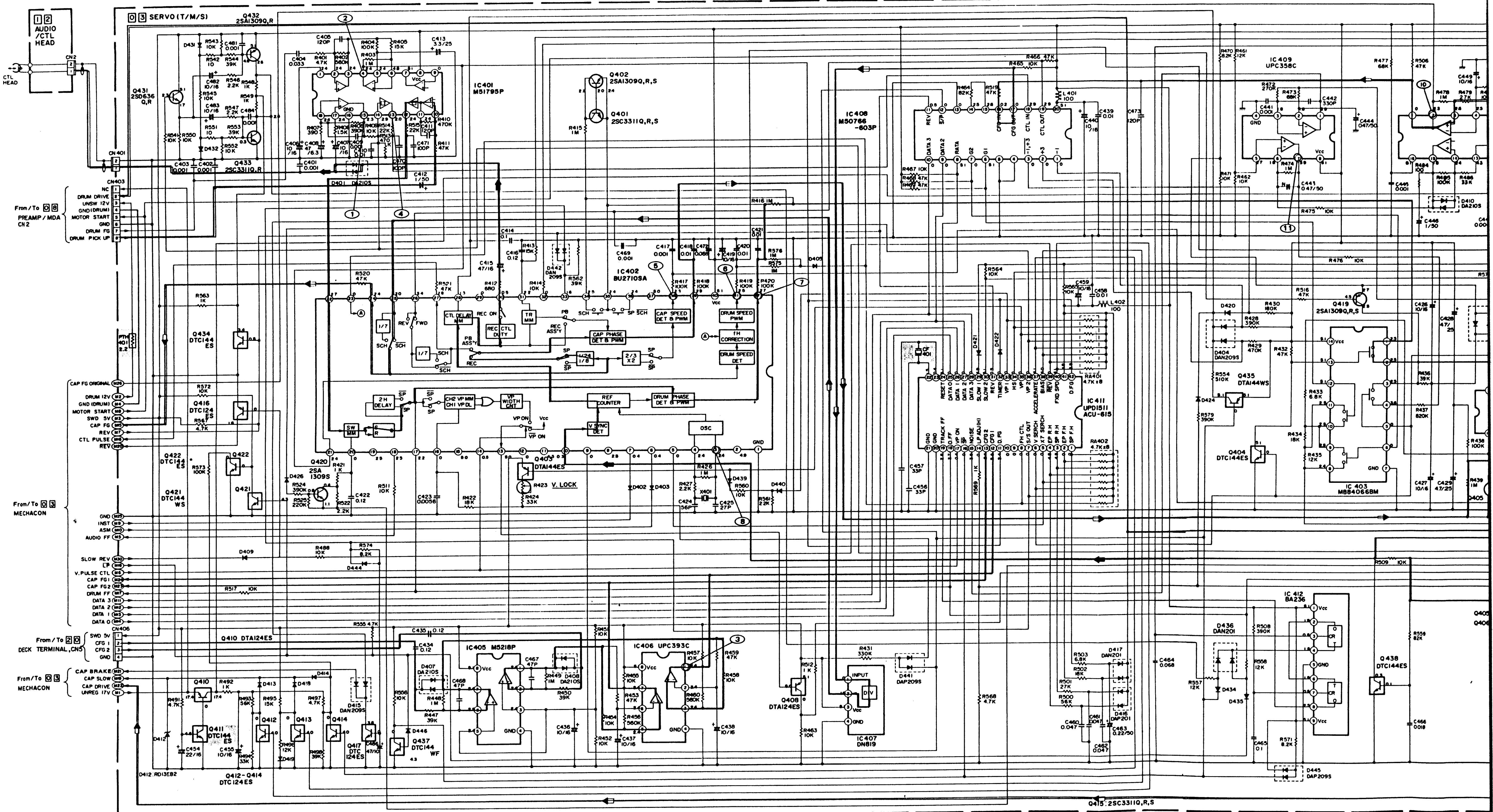
C102
TIMER CLOCK

R423
V. LOCK

FROM SERVO
IC101
IC102
IC103
IC104
IC105
IC106
IC107
IC201
IC202
IC204
IC205
IC206
IC401
IC402
IC403
IC404
IC405
IC406
IC407
IC408
IC409
IC410
IC411
IC412
IC413
JVCD75V0
STROBE
TP1
TP2
TP4
TP6
TP7
SW1
J501
J502
J503
J504
J505
J506
J507
J508
CN202
CN203
CN204
CN210
CN212
CN214
CN401
CN403
CN404
CN406
CN407
T/M/S PWB ASS'Y
PU11448D1-04
03

0 3 Servo-Platte
Servo Circuit Board


R10
CLOCK ADJ
C102
TIMER CLOCK
R423
V. LOCK
STROBE
JVCD75V0
FROM SERVO
PU11448D1-04
T/M/S PWB ASSY



02 AUDIO /CTL HEAD
CTL HEAD
CN2
03 SERVO (T/M/S)
IC401 M51795P
IC402 BU2710SA
IC403 MB84066BM
IC405 M5218P
IC406 UPC393C
IC407 DN819
IC408 M50766 -603P
IC409 UPC358C
IC411 UPD1511 ACU-615
IC412 BA236
Q401 2SC3311Q,R,S
Q402 2SA1309Q,R,S
Q403 DTA144ES
Q404 DTC144ES
Q408 DTA124ES
Q410 DTA124ES
Q412-Q414 DTC124ES
Q415 2SC3311Q,R,S
Q416 DTC124ES
Q419 2SA1309Q,R,S
Q420 2SA 1309S
Q421 DTC144 WS
Q422 DTC144 ES
Q431 2SD636 Q,R
Q432 2SA1309Q,R
Q433 2SC3311Q,R
Q434 DTC144 ES
Q435 DTA144WS
Q437 DTC144 WF
Q438 DTC144ES
From/To 06 PREAMP/MDA CN2
From/To 03 MECHACON
From/To 20 DECK TERMINAL,CN5
V. LOCK
REF COUNTER
DRUM PHASE DET & PWM
CAP SPEED DET & PWM
DRUM SPEED PWM
DRUM SPEED DET
TH CORRECTION
OSC
V SYNC DET
VP WIDTH CNT
2H DELAY
SW MM
CTL DELAY MM
REC CTL DUTY
TR MM
CAP PHASE DET & PWM
D412 RD13EB2

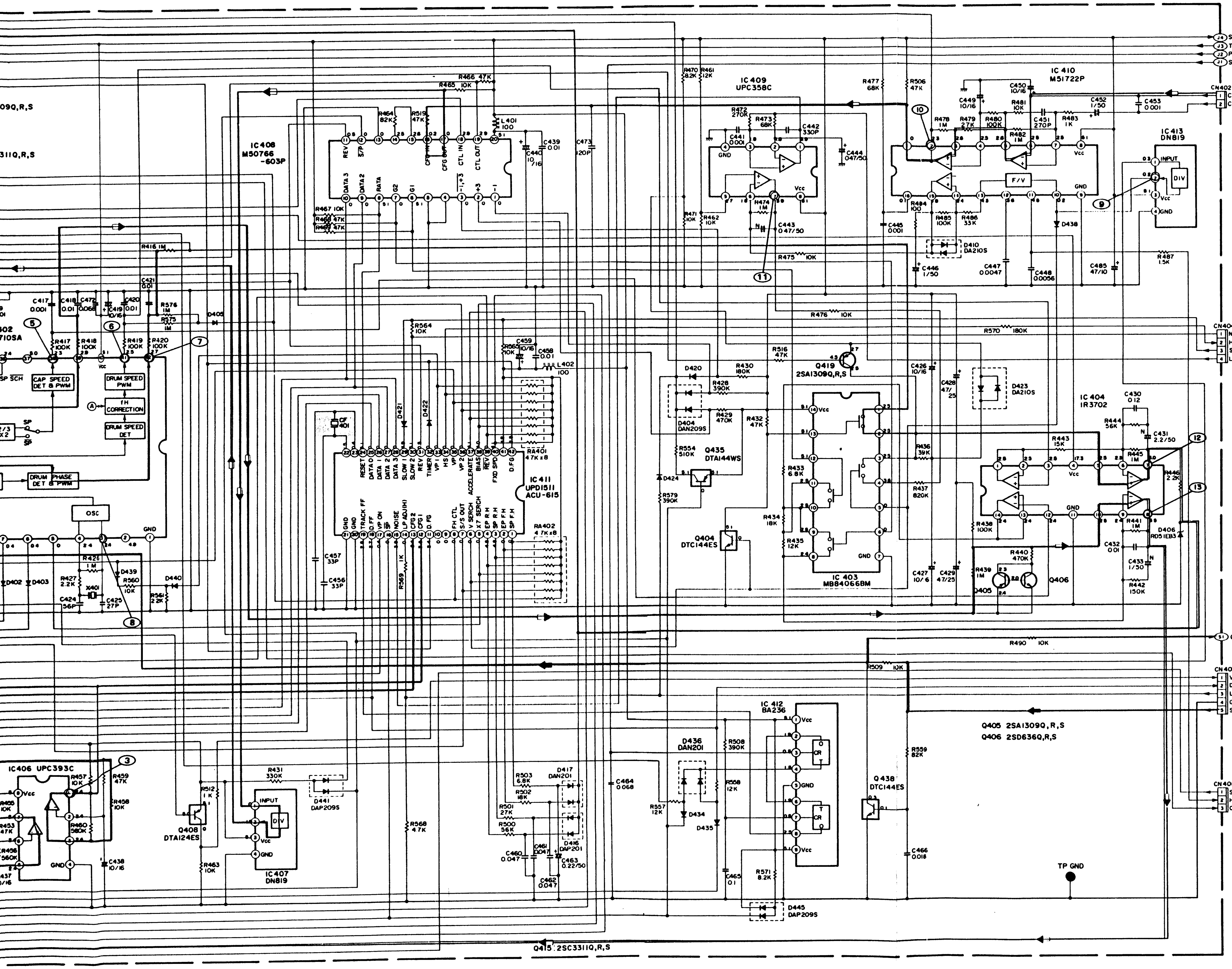
Grau unterlegte Bauteile sind Sicherheitsbauteile und dürfen nur durch Originalteile ersetzt werden!

Alle Gleichspannungen sind mit einem Digitalvoltmeter im Wiedergabe-Betrieb gemessen.

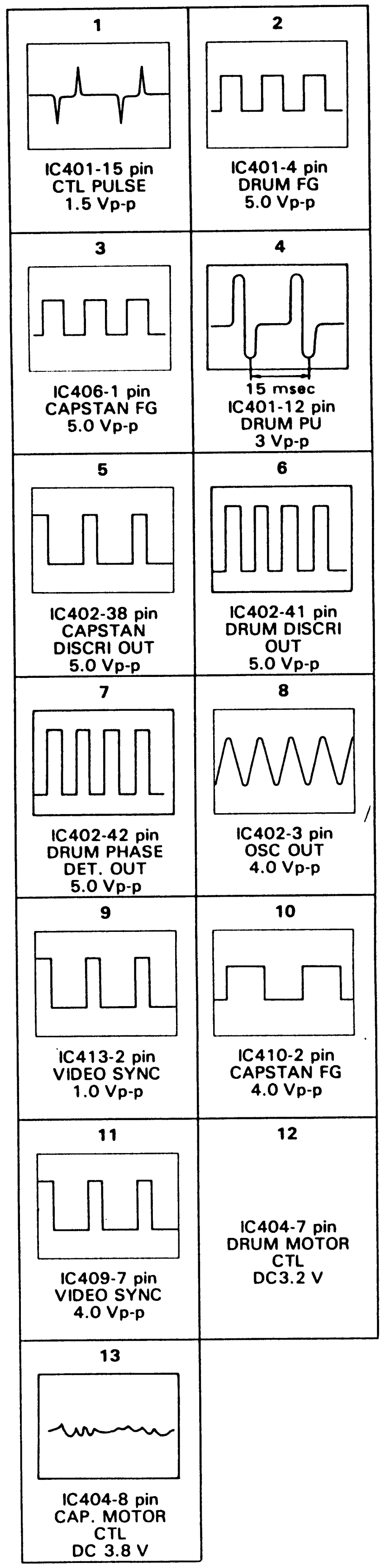
NOTE:
1. Sha
safe
par

0 3

Servo-Schaltung
Servo Schematic Diagram


IC 409 UPC358C
IC 410 M51722P
IC 413 DN819
IC 408 M50766 -603P
IC 411 UPD1511 ACU-615
IC 403 MB84066BM
IC 404 IR3702
IC 406 UPC393C
IC 407 DN819
IC 412 BA236
Q419 2SA1309Q,R,S
Q435 DTA144WS
Q404 DTC144ES
Q438 DTC144ES
Q408 DTA124ES
Q415 2SC3311Q,R,S
Q405 2SA1309Q,R,S
Q406 2SD636Q,R,S
SWD 5V
TRACKING VR
PRESET
SLOW TRACKING
From/To 0 3 MECHACON
CN402
C FG(+)
C FG(-)
From 2 0 DECK TERMINAL CN1
CN404
NC
HEAD SEL
SLOW CTL
LP FM ENV
From/To 3 5 PRE/RECORDER CN4
To 0 3 TIMER
C SYNC
CN407
V PULSE
DRUM FF
LP ADJ
GND
SYNC
From/To 0 2 VIDEO (Luminance) CN7
CN408
SW POINT
H DISCRI
CTL PULSE
From/To 0 2 VIDEO (COLOUR) CN3
TP GND
CAP SPEED DET & PWM
DRUM SPEED PWM
FH CORRECTION
DRUM SPEED DET
DRUM PHASE DET & PWM
OSC
F/V
DIV

Servo-Oszillogramme
Servo Waveforms



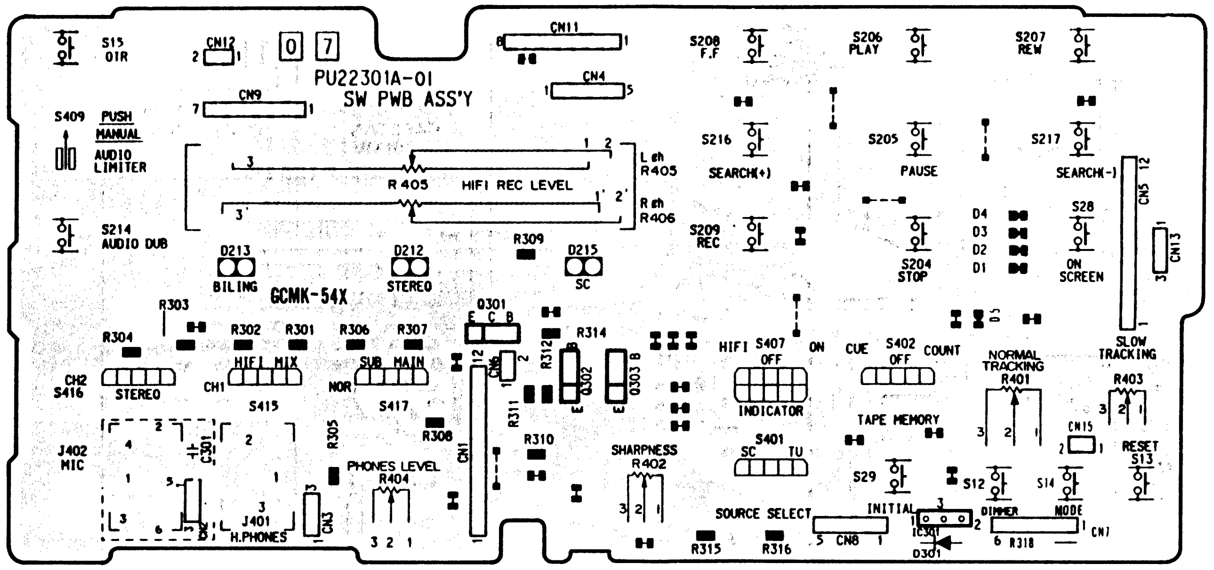
Grau unterlegte Bauteile sind Sicherheitsbauteile und dürfen nur durch Originalteile ersetzt werden!

Alle Gleichspannungen sind mit einem Digitalvoltmeter im Wiedergabe-Betrieb gemessen.

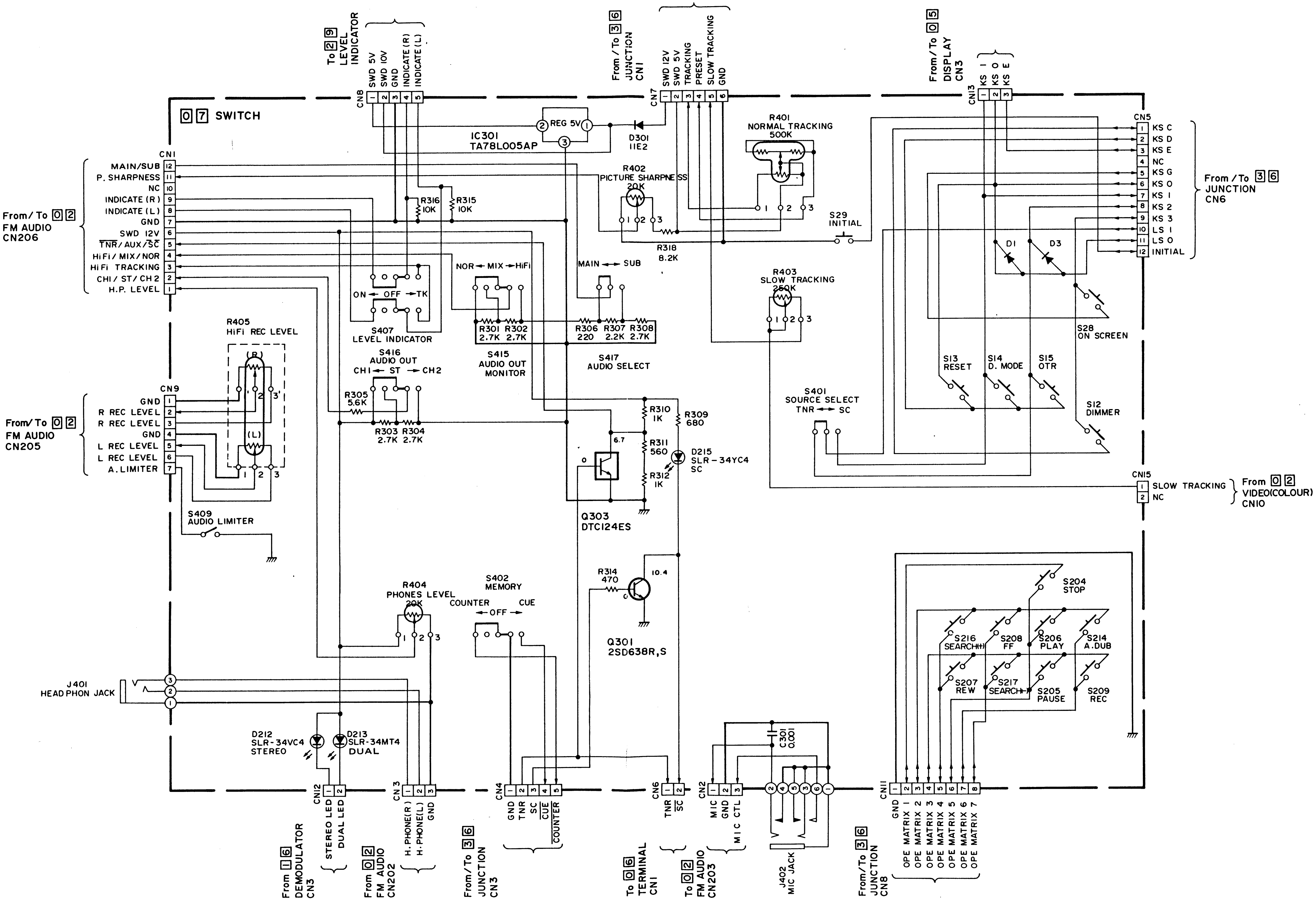
NOTES:

1. Shaded (▨) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during PLAY BACK mode.

0 7 Schalter-Platte
Switch Circuit Board

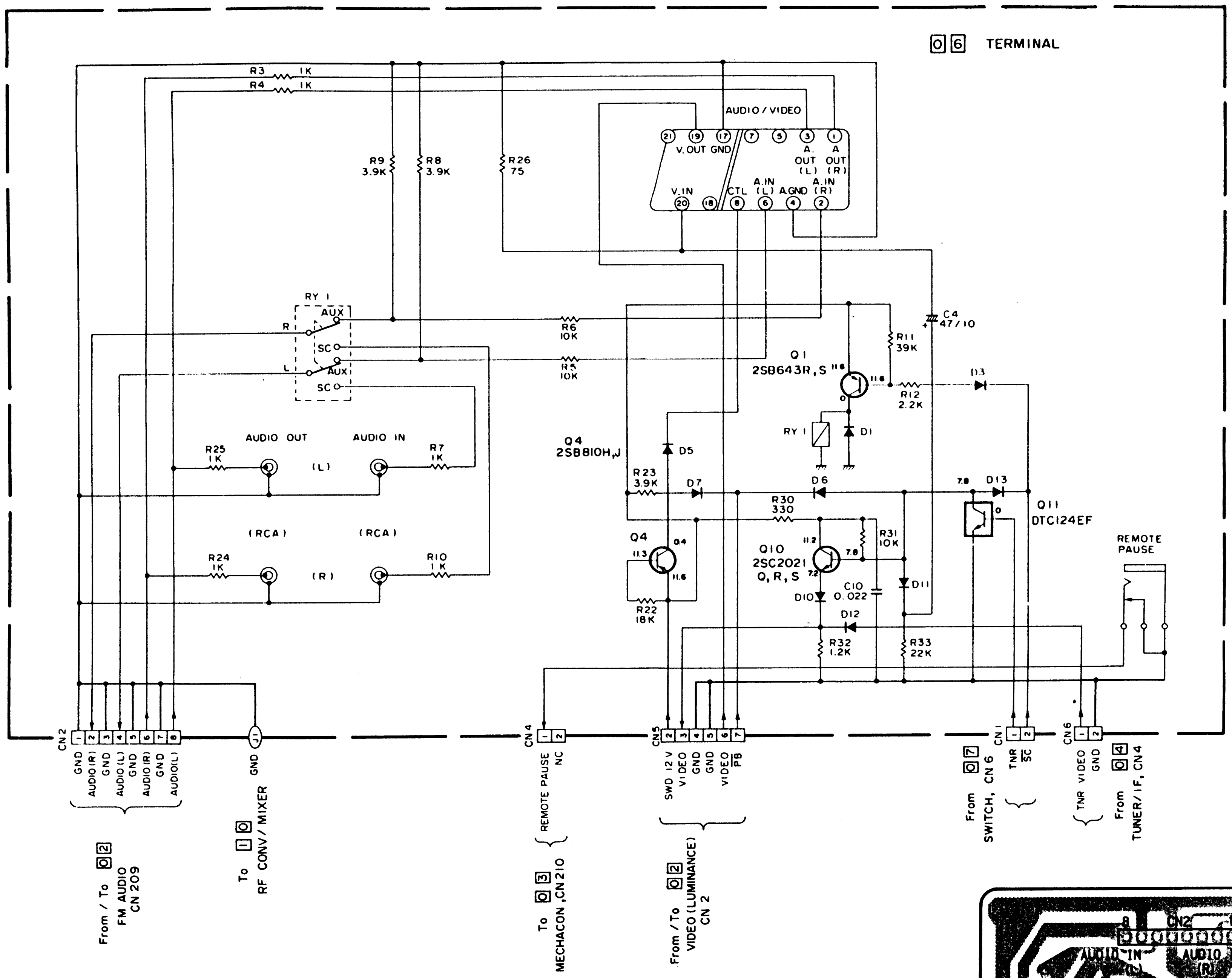

S15
OIR
CN12
0 7
PU22301A-01
SW PWB ASS'Y
CN9
CN11
CN4
S409
PUSH
MANUAL
AUDIO
LIMITER
R405
HIFI REC LEVEL
L ch
R405
R ch
R406
S214
AUDIO DUB
D213
BILING
GCMK-54X
D212
STEREO
R309
D215
SC
R303
R304
R302
R301
R306
R307
Q301
E C B
R314
R312
Q302
Q303
CH2
S416
STEREO
CH1
HIFI MIX
S415
NOR
SUB MAIN
S417
R305
R308
R311
R310
CN6
CN1
J402
MIC
C301
J401
H.PHONES
CN3
PHONES LEVEL
R404
SHARPNESS
R402
S208
F.F
S206
PLAY
S207
REW
S216
SEARCH(+)
S205
PAUSE
S217
SEARCH(-)
S209
REC
S204
STOP
D4
D3
D2
D1
D5
S28
ON
SCREEN
CN5
CN13
HIFI
S407
OFF
ON
INDICATOR
CUE
S402
OFF
COUNT
TAPE MEMORY
S401
SC
TU
NORMAL
TRACKING
R401
SLOW
TRACKING
R403
CN15
RESET
S13
S29
S12
S14
SOURCE SELECT
INITIAL
DIMMER
MODE
CN8
IC301
D301
R318
CN7
R315
R316

0 7 Schalter-Schaltung
Switch Schematic Diagram



0 7 SWITCH
To 2 9 LEVEL INDICATOR
CN8
SWD 5V
SWD 10V
GND
INDICATE (R)
INDICATE (L)
From / To 3 6 JUNCTION CN1
CN7
SWD 12V
SWD 5V
TRACKING
PRESET
SLOW TRACKING
GND
From / To 0 5 DISPLAY CN3
CN13
KS I
KS O
KS E
REG 5V
IC301 TA78L005AP
D301 11E2
R401 NORMAL TRACKING 500K
R402 PICTURE SHARPNESS 20K
R318 8.2K
S29 INITIAL
CN5
KS C
KS D
KS E
NC
KS G
KS O
KS I
KS 2
KS 3
LS I
LS O
INITIAL
From / To 3 6 JUNCTION CN6
CN1
MAIN/SUB
P. SHARPNESS
NC
INDICATE (R)
INDICATE (L)
GND
SWD 12V
TNR/AUX/SC
HiFi/MIX/NOR
HiFi TRACKING
CH1/ST/CH2
H.P. LEVEL
From/ To 0 2 FM AUDIO CN206
R316 10K
R315 10K
ON ← OFF → TK
S407 LEVEL INDICATOR
NOR ← MIX → HiFi
R301 2.7K
R302 2.7K
S415 AUDIO OUT MONITOR
MAIN ←→ SUB
R306 220
R307 2.2K
R308 2.7K
S417 AUDIO SELECT
R403 SLOW TRACKING 250K
D1
D3
S28 ON SCREEN
S13 RESET
S14 D. MODE
S15 OTR
S401 SOURCE SELECT
TNR ←→ SC
S12 DIMMER
R405 HiFi REC LEVEL
(R)
(L)
CN9
GND
R REC LEVEL
R REC LEVEL
GND
L REC LEVEL
L REC LEVEL
A. LIMITER
From/ To 0 2 FM AUDIO CN205
S416 AUDIO OUT
CH1 ← ST → CH2
R305 5.6K
R303 2.7K
R304 2.7K
R310 1K
R309 680
6.7
R311 560
D215 SLR-34YC4 SC
R312 1K
Q303 DTC124ES
CN15
SLOW TRACKING
NC
From 0 2 VIDEO(COLOUR) CN10
S409 AUDIO LIMITER
R404 PHONES LEVEL 20K
S402 MEMORY
COUNTER ← OFF → CUE
R314 470
10.4
Q301 2SD638R,S
S204 STOP
S216 SEARCH
S208 FF
S206 PLAY
S214 A.DUB
S207 REW
S217 SEARCH
S205 PAUSE
S209 REC
J401 HEAD PHON JACK
D212 SLR-34VC4 STEREO
D213 SLR-34MT4 DUAL
C301 0.001
CN12
STEREO LED
DUAL LED
From 1 6 DEMODULATOR CN3
CN3
H.PHONE(R)
H.PHONE(L)
GND
From 0 2 FM AUDIO CN202
CN4
GND
TNR
SC
CUE
COUNTER
From/To 3 6 JUNCTION CN3
CN6
TNR
SC
To 0 6 TERMINAL CN1
CN2
MIC
GND
MIC CTL
To 0 2 FM AUDIO CN203
J402 MIC JACK
CN11
GND
OPE MATRIX 1
OPE MATRIX 2
OPE MATRIX 3
OPE MATRIX 4
OPE MATRIX 5
OPE MATRIX 6
OPE MATRIX 7
From/To 3 6 JUNCTION CN8

0 6 Anschlußbuchsen Terminal



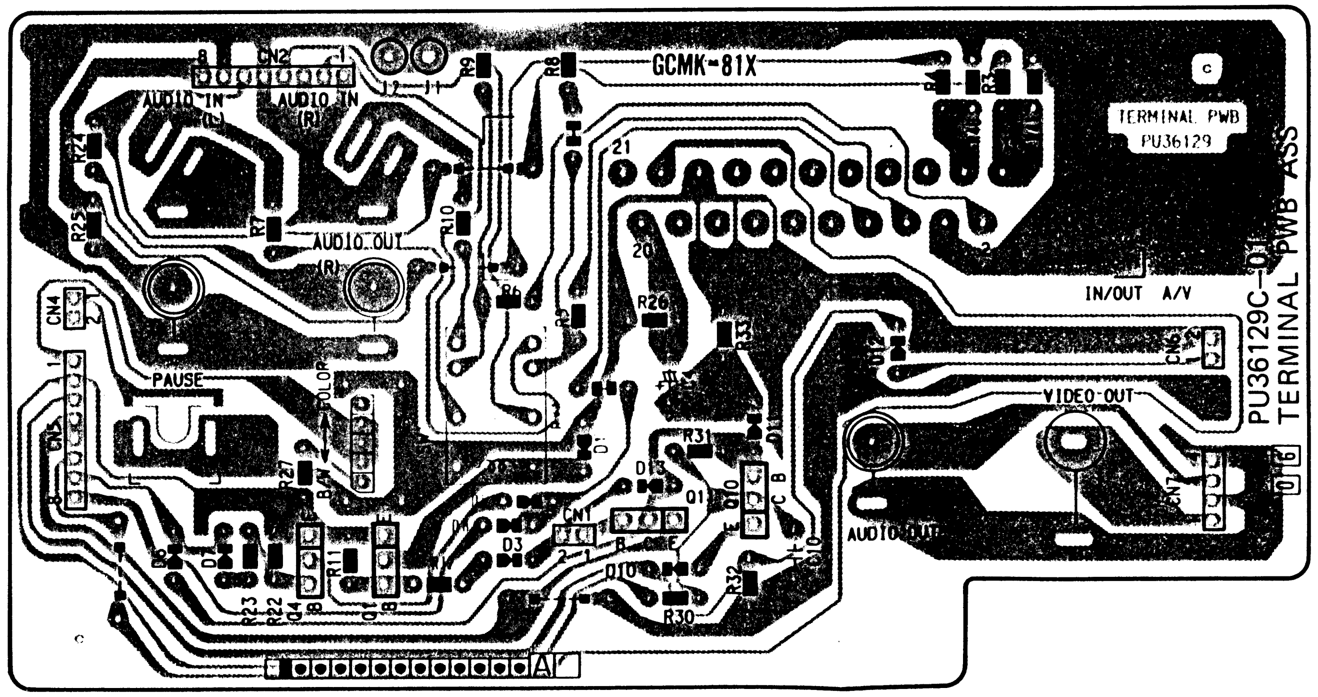
06 TERMINAL
AUDIO / VIDEO
V. OUT GND
A. OUT (L)
A OUT (R)
V. IN
CTL
A. IN (L)
AGND
A. IN (R)
R3 1K
R4 1K
R9 3.9K
R8 3.9K
R26 75
RY 1
AUX
SC
R6 10K
R5 10K
Q1 2SB643R,S
C4 47/10
R11 39K
R12 2.2K
D3
D1
Q4 2SB810H,J
D5
R23 3.9K
D7
D6
R30 330
D13
Q11 DTC124EF
AUDIO OUT
AUDIO IN
R25 1K
R7 1K
(L)
(RCA)
(RCA)
R24 1K
(R)
R10 1K
Q10 2SC2021 Q,R,S
R31 10K
C10 0.022
D10
D11
D12
R22 18K
R32 1.2K
R33 22K
REMOTE PAUSE
CN2
GND
AUDIO(R)
GND
AUDIO(L)
GND
AUDIO(R)
GND
AUDIO(L)
From / To 02 FM AUDIO CN 209
J1
GND
To 10 RF CONV / MIXER
CN4
REMOTE PAUSE
NC
To 03 MECHACON, CN 210
CN5
SWD 12 V
VIDEO
GND
GND
VIDEO
PB
From / To 02 VIDEO (LUMINANCE) CN 2
CN1
TNR
SC
From 07 SWITCH, CN 6
CN6
TNR VIDEO
GND
From 04 TUNER / IF, CN4

NOTE

Voltages are DC-measured with a digital voltmeter during stop mode.

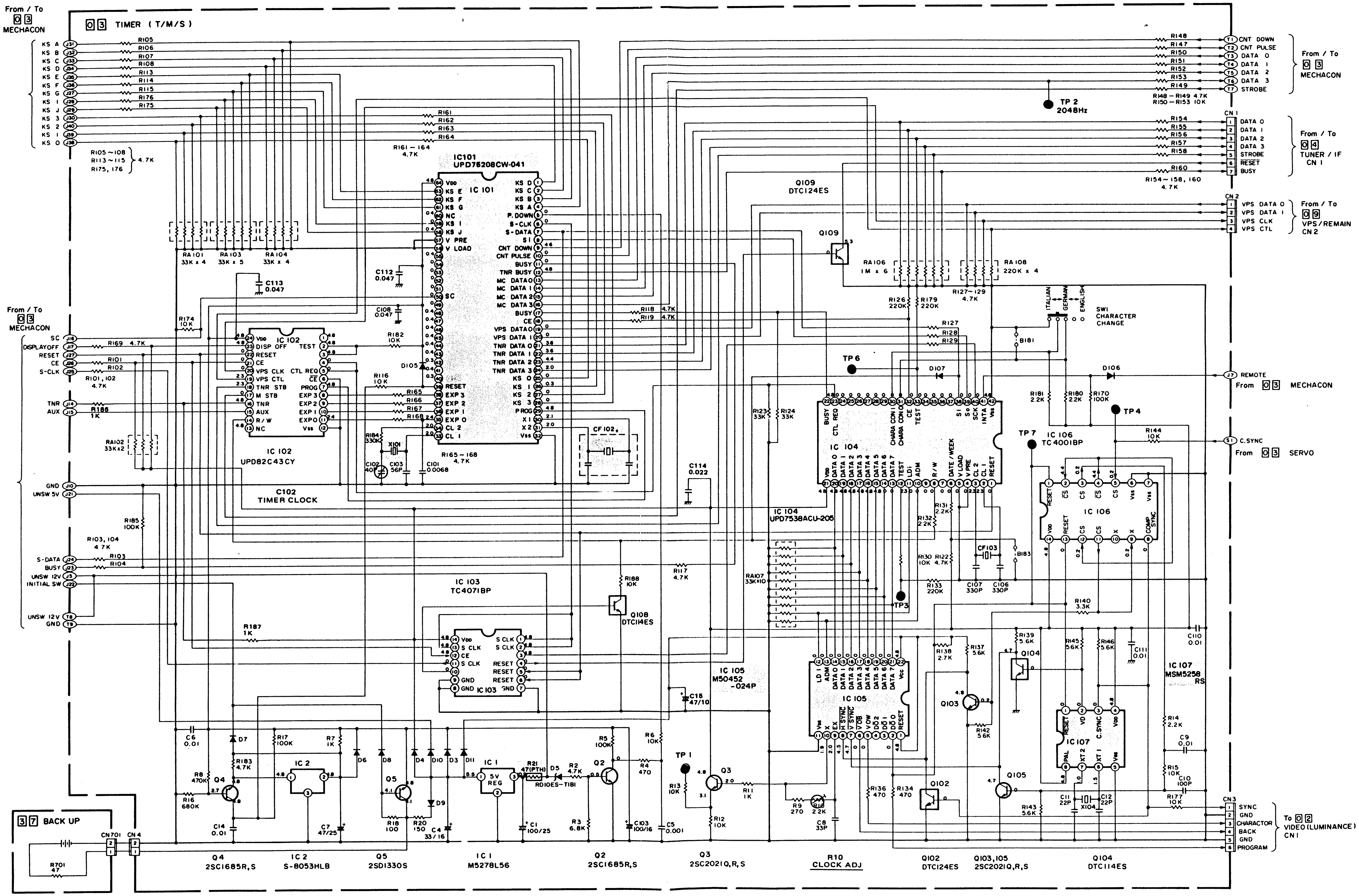
Alle Gleichspannungen sind mit einem Digitalvoltmeter im Stopp-Betrieb gemessen.

0 6 Anschlußbuchsen-Platte Terminal Circuit Board



GCMK-81X
TERMINAL PWB
PU36129
PU36129C-01 TERMINAL PWB ASS
CN2
AUDIO IN (L)
AUDIO IN (R)
AUDIO OUT (R)
AUDIO OUT
IN/OUT A/V
VIDEO OUT
PAUSE
COLOR
CN4
CN5
CN1
CN6
21
20
Q1
Q4
Q10
D3
D10
D13
R30
R31
R32
06

0 3 Timer-Schaltung
Timer Schematic Diagram


From / To 03 MECHACON
03 TIMER (T/M/S)
KS A
KS B
KS C
KS D
KS E
KS F
KS G
KS I
KS J
KS 3
KS 2
KS 1
KS 0
R105~108, R113~115, R175, 176 4.7K
R161~164 4.7K
IC101 UPD75208CW-041
RA101 33K x 4
RA103 33K x 5
RA104 33K x 4
C112 0.047
C113 0.047
C108 0.047
From / To 03 MECHACON
SC
DISPLAY OFF
RESET
CE
S-CLK
R169 4.7K
R101, 102 4.7K
TNR
AUX
R186 1K
RA102 33K x 2
IC 102 UPD82C43CY
C102 TIMER CLOCK
GND
UNSW 5V
R185 100K
R103, 104 4.7K
S-DATA
BUSY
UNSW 12V
INITIAL SW
UNSW 12V
GND
R187 1K
IC 103 TC4071BP
R165~168 4.7K
R188 10K
Q108 DTC114ES
Q109 DTC124ES
RA106 1M x 6
RA108 220K x 4
R127~129 4.7K
R126 220K
R179 220K
R118 4.7K
R119 4.7K
SW1 CHARACTER CHANGE
ITALIAN
GERMAN
ENGLISH
TP 2 2048Hz
CNT DOWN
CNT PULSE
DATA 0
DATA 1
DATA 2
DATA 3
STROBE
R148~R149 4.7K
R150~R153 10K
From / To 03 MECHACON
CN 1
DATA 0
DATA 1
DATA 2
DATA 3
STROBE
RESET
BUSY
R154~158, 160 4.7K
From / To 04 TUNER / IF CN 1
CN 2
VPS DATA 0
VPS DATA 1
VPS CLK
VPS CTL
From / To 09 VPS/REMAIN CN 2
REMOTE
From 03 MECHACON
C.SYNC
From 03 SERVO
TP 6
TP 4
TP 7
IC 106 TC4001BP
IC 104 UPD7538ACU-205
RA107 33K x 10
TP3
CF103
C107 330P
C106 330P
R133 220K
R140 3.3K
IC 105 M50452-024P
IC 107 MSM5258RS
C110 0.01
C111 0.01
Q104
Q103
Q105
Q102
R10 CLOCK ADJ
TP 1
C9 0.01
C10 100P
X104
CN3
SYNC
GND
CHARACTOR
BACK
GND
PROGRAM
To 02 VIDEO (LUMINANCE) CN 1
37 BACK UP
CN701
CN 4
R701 47
IC 1 5V REG
RD10ES-T1B1
IC 2
C6 0.01
C14 0.01
C7 47/25
C1 100/25
C103 100/16
C5 0.001
C15 47/10
Q4 2SC1685R,S
IC 2 S-8053HLB
Q5 2SD1330S
IC 1 M5278L56
Q2 2SC1685R,S
Q3 2SC2021Q,R,S
R10 CLOCK ADJ
Q102 DTC124ES
Q103,105 2SC2021Q,R,S
Q104 DTC114ES

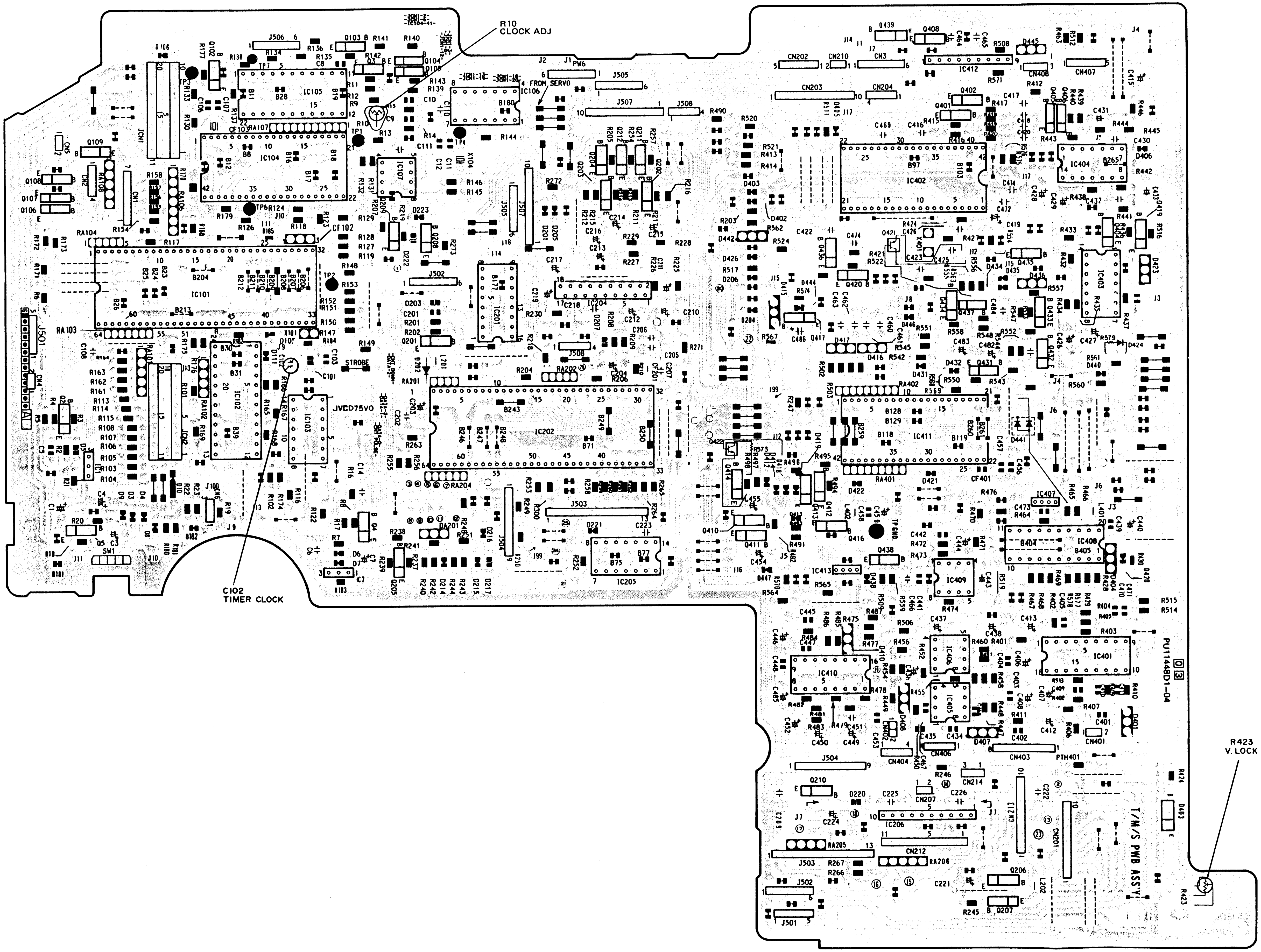
Alle Gleichspannungen sind mit einem Digitalvoltmeter im Stopp-Betrieb gemessen.

Grau unterlegte Bauteile sind Sicherheitsbauteile und dürfen nur durch Originalteile ersetzt werden!

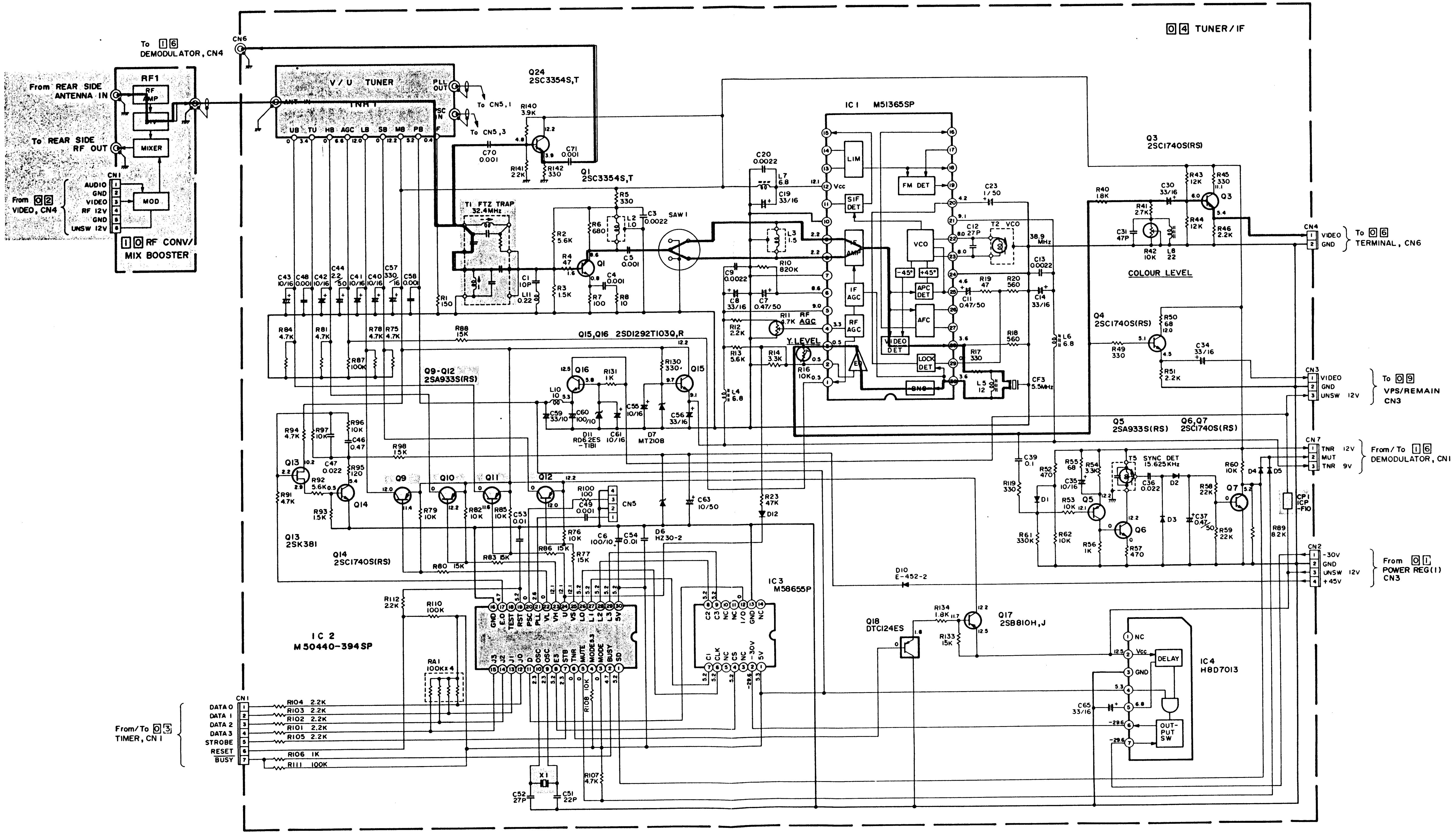
NOTES:

1. Shaded (■) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during stop mode.

0 3 Timer-Platte
Timer Circuit Board


R10
CLOCK ADJ
C102
TIMER CLOCK
R423
V. LOCK
FROM SERVO
JVCD75VO
STROBE
T/M/S PWB ASS'Y
PU1144BD1-04
IC101
IC102
IC103
IC104
IC105
IC106
IC107
IC201
IC202
IC204
IC205
IC206
IC401
IC402
IC403
IC404
IC405
IC406
IC407
IC408
IC409
IC410
IC411
IC412
IC413

0 4 Tuner/ZF-Schaltung
Tuner/IF Schematic Diagram



04 TUNER / IF
To 16 DEMODULATOR, CN4
CN6
From REAR SIDE ANTENNA IN
To REAR SIDE RF OUT
RF1
RF AMP
MIXER
MOD
From 02 VIDEO, CN4
AUDIO
GND
VIDEO
RF 12V
GND
UNSW 12V
10 RF CONV/ MIX BOOSTER
V/U TUNER
TNR1
PLL OUT
To CN5, 1
To CN5, 3
Q24 2SC3354S,T
R140 3.9K
R141 2.2K
R142 330
C70 0.001
C71 0.001
Q1 2SC3354S,T
T1 FTZ TRAP 32.4MHz
SAW1
IC1 M51365SP
LIM
FM DET
SIF DET
VCO
APC DET
AFC
IF AGC
RF AGC
VIDEO DET
LOCK DET
Y. LEVEL
T2 VCO
38.9 MHz
CF3 5.5MHz
Q3 2SC1740S(RS)
COLOUR LEVEL
Q4 2SC1740S(RS)
CN4
VIDEO
GND
To 06 TERMINAL, CN6
CN3
VIDEO
GND
UNSW 12V
To 09 VPS/REMAIN CN3
Q5 2SA933S(RS)
Q6,Q7 2SC1740S(RS)
T5 SYNC DET 15.625KHz
CN7
TNR 12V
MUT
TNR 9V
From/To 16 DEMODULATOR, CN1
CP1 ICP -F10
CN2
-30V
GND
UNSW 12V
+45V
From 01 POWER REG(1) CN3
Q15,Q16 2SD1292T1030,R
Q9-Q12 2SA933S(RS)
D11 RD6.2ES -T1B1
D7 MTZ108
Q13 2SK381
Q14 2SC1740S(RS)
CN5
D6 HZ30-2
IC3 M58655P
D10 E-452-2
Q18 DTC124ES
Q17 2SB810H,J
IC4 H8D7013
DELAY
OUT-PUT SW
IC2 M50440-394SP
RA1 100K×4
X1
C52 27P
C51 22P
CN1
DATA 0
DATA 1
DATA 2
DATA 3
STROBE
RESET
BUSY
R104 2.2K
R103 2.2K
R102 2.2K
R101 2.2K
R105 2.2K
R106 1K
R111 100K
From/To 03 TIMER, CN1

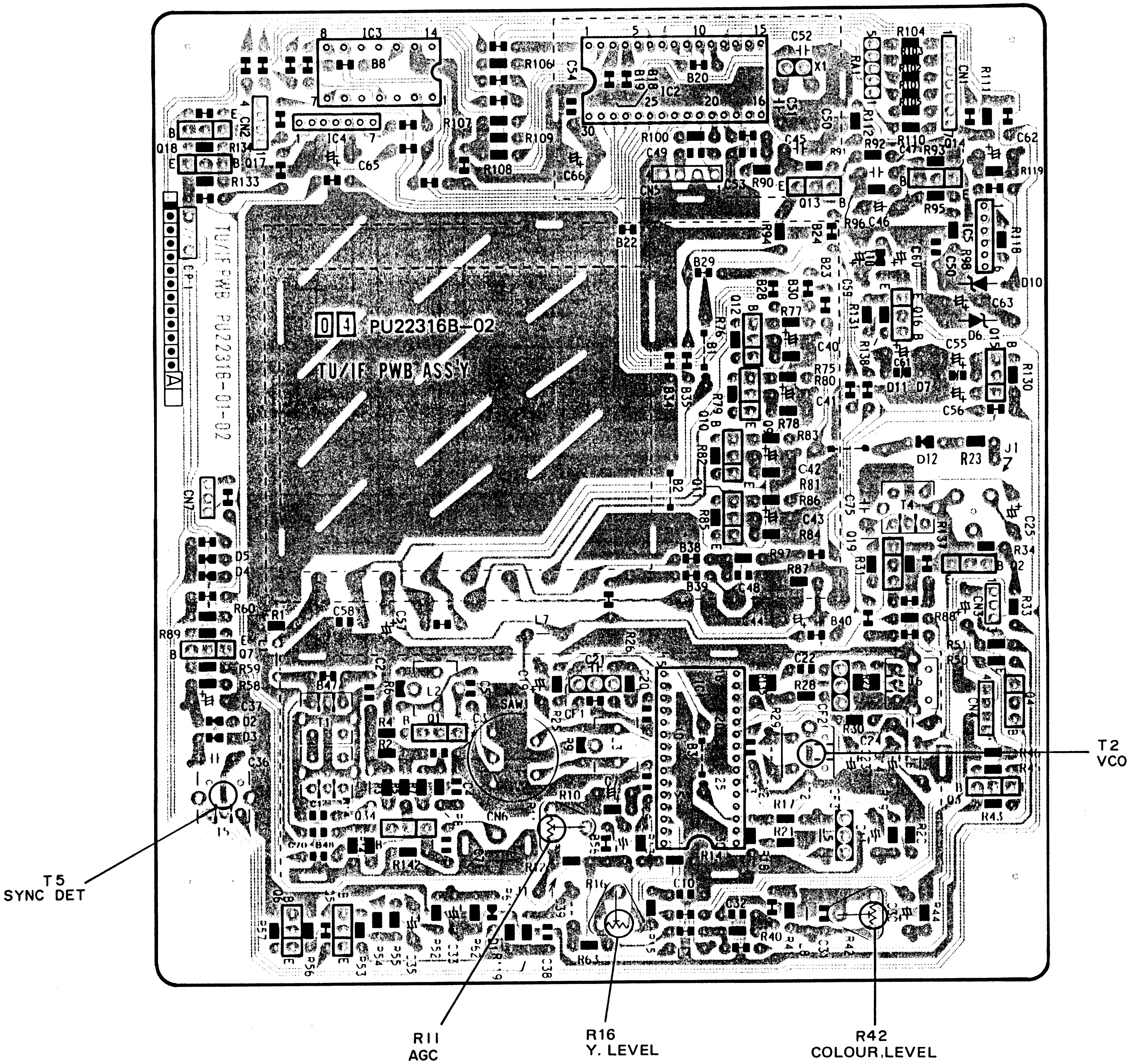
▨ Grau unterlegte Bauteile sind Sicherheitsbauteile und dürfen nur durch Originalteile ersetzt werden!

Alle Gleichspannungen sind mit einem Digitalvoltmeter im Stopp-Betrieb gemessen.

NOTES:

1. Shaded (■) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during stop mode.

0 4 Tuner/ZF-Platte
Tuner/IF Circuit Board



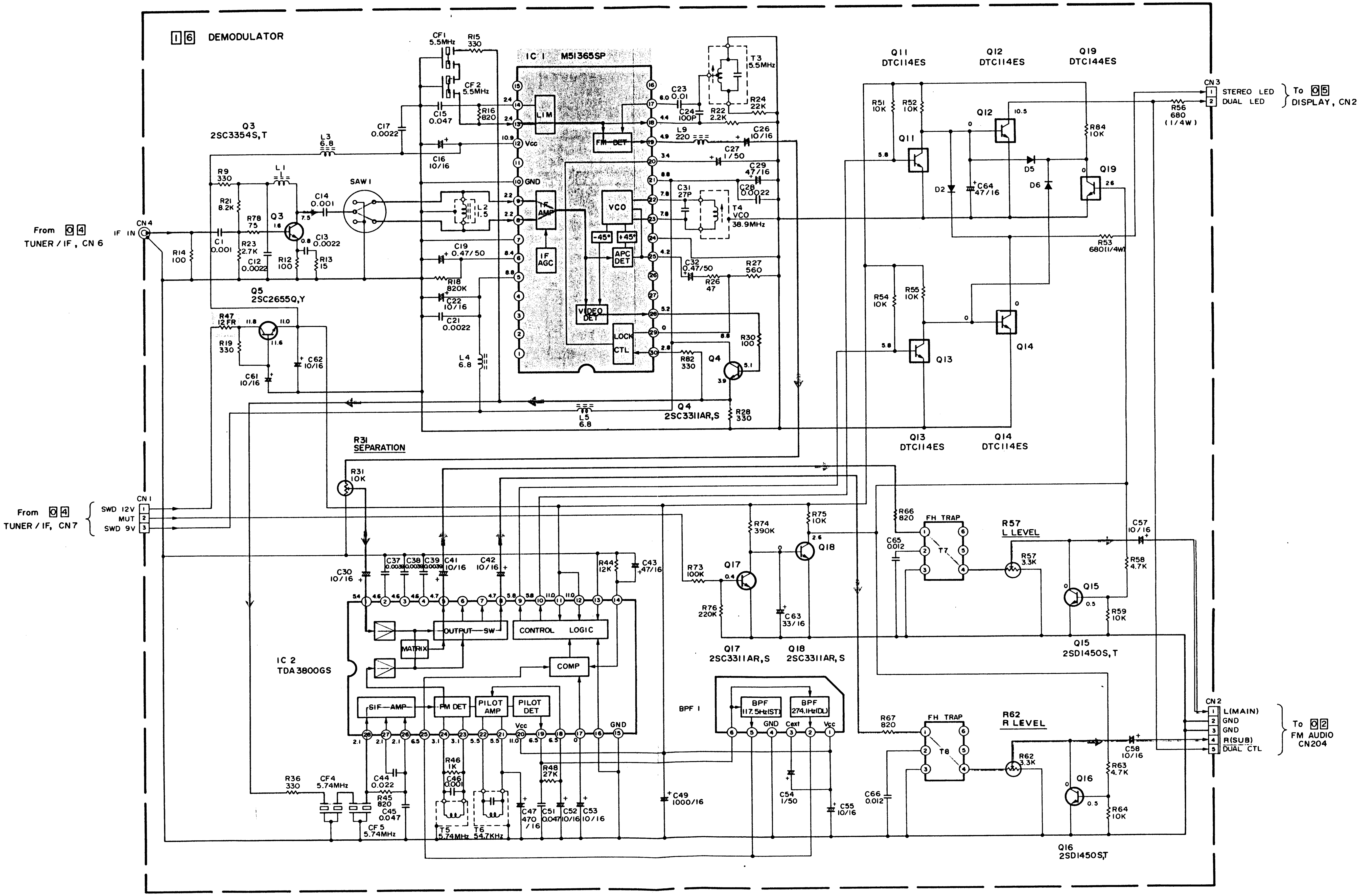
04 PU22316B-02
TU/IF PWB ASS'Y
TU/IF PWB PU22316C-01-02
IC2
IC3
IC4
IC5
CN1
CN2
CN3
CN5
CN6
CN7
CP-1
SAW
T5
SYNC DET
R11
AGC
R16
Y. LEVEL
R42
COLOUR.LEVEL
T2
VCO

Grau unterlegte Bauteile sind Sicherheitsbauteile und dürfen nur durch Originalteile ersetzt werden!

Alle Gleichspannungen sind mit einem Digitalvoltmeter im Stopp-Betrieb gemessen.

1 6

Demodulator-Schaltung
Demodulator Schematic Diagram



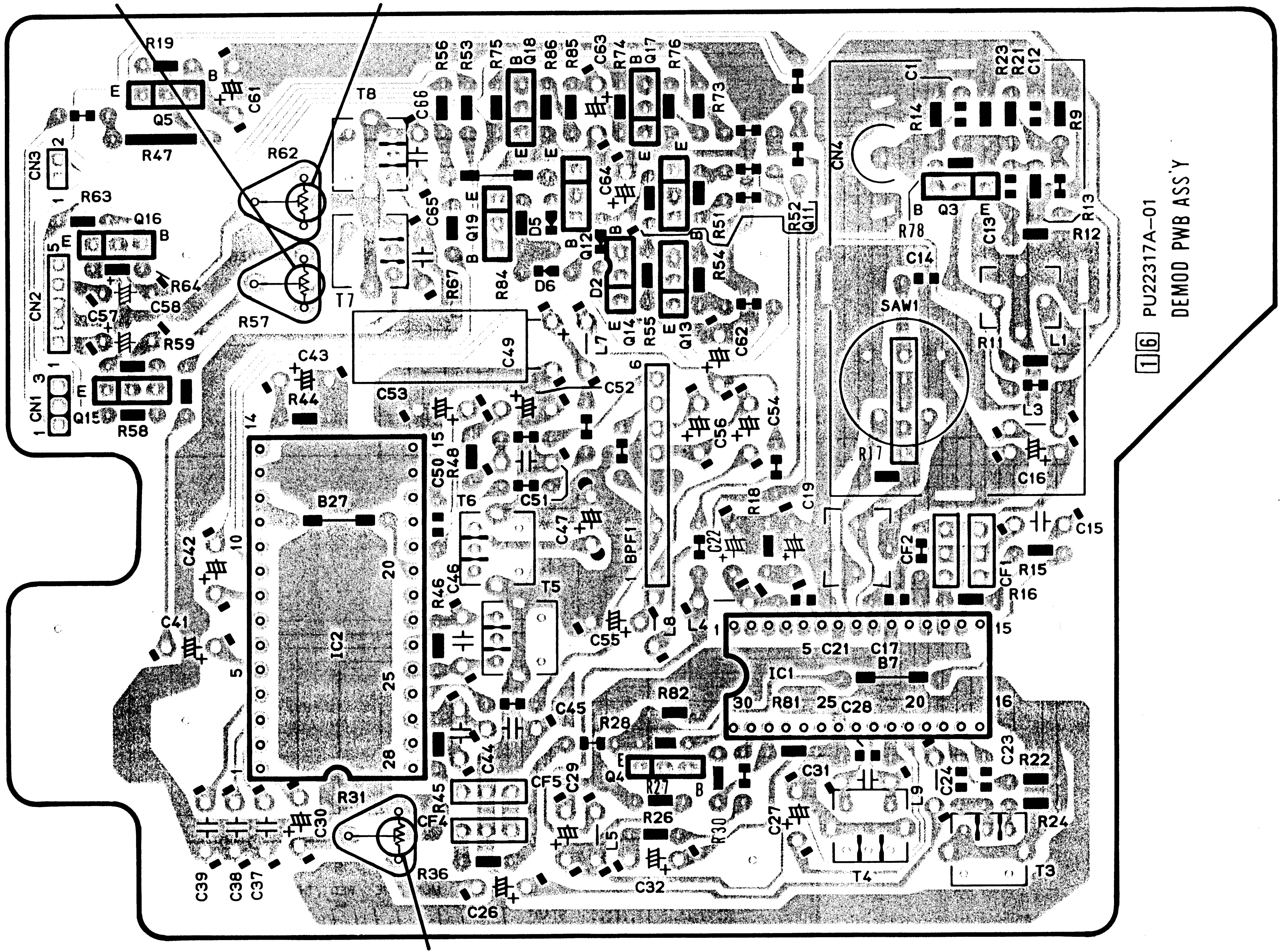
16 DEMODULATOR
From 04 TUNER / IF, CN 6
IF IN
CN4
From 04 TUNER / IF, CN7
CN1
SWD 12V
MUT
SWD 9V
Q3 2SC3354S,T
Q5 2SC2655Q,Y
SAW1
L1
L2 11.5
L3 6.8
L4 6.8
L5 6.8
CF1 5.5MHz
CF2 5.5MHz
R15 330
R16 820
C15 0.047
C16 10/16
C17 0.0022
C14 0.001
C13 0.0022
C1 0.001
C12 0.0022
R9 330
R21 8.2K
R78 75
R23 2.7K
R12 100
R13 15
R14 100
R47 12FR
R19 330
C61 10/16
C62 10/16
C19 0.47/50
R18 820K
C22 10/16
C21 0.0022
IC1 M51365SP
LIM
FM DET
IF AMP
IF AGC
VCO
-45°
+45°
APC DET
VIDEO DET
LOCK CTL
GND
Vcc
T3 5.5MHz
T4 VCO 38.9MHz
C23 0.01
C24 100P
R22 2.2K
R24 22K
L9 220
C26 10/16
C27 1/50
C29 47/16
C28 0.0022
C31 27P
C32 0.47/50
R26 47
R27 560
R30 100
R82 330
R28 330
Q4
Q4 2SC3311AR,S
R31 SEPARATION
R31 10K
C30 10/16
C37 0.0039
C38 0.0039
C39 0.0039
C41 10/16
C42 10/16
R44 12K
C43 47/16
IC 2 TDA3800GS
OUTPUT-SW
MATRIX
CONTROL LOGIC
COMP
SIF-AMP
FM DET
PILOT AMP
PILOT DET
GND
Vcc
R36 330
CF4 5.74MHz
CF5 5.74MHz
C44 0.022
R45 820
C45 0.047
R46 1K
C46 0.001
T5 5.74MHz
T6 54.7KHz
C47 470/16
C51 0.047
C52 10/16
C53 10/16
R48 27K
C49 1000/16
BPF 1
BPF 117.5Hz(ST)
BPF 274.1Hz(DL)
Cext
C54 1/50
C55 10/16
Q17 2SC3311AR,S
Q18 2SC3311AR,S
R73 100K
R74 390K
R75 10K
R76 220K
C63 33/16
Q11 DTC114ES
Q12 DTC114ES
Q19 DTC144ES
Q13 DTC114ES
Q14 DTC114ES
R51 10K
R52 10K
R54 10K
R55 10K
R84 10K
R53 680(1/4W)
R56 680 (1/4W)
D2
D5
D6
C64 47/16
CN3
STEREO LED
DUAL LED
To 05 DISPLAY, CN2
R66 820
FH TRAP
T7
C65 0.012
R57 L LEVEL
R57 3.3K
C57 10/16
R58 4.7K
R59 10K
Q15 2SD1450S,T
R67 820
T8
C66 0.012
R62 R LEVEL
R62 3.3K
C58 10/16
R63 4.7K
R64 10K
Q16 2SD1450S,T
CN2
L(MAIN)
GND
GND
R(SUB)
DUAL CTL
To 02 FM AUDIO CN204

NOTES:
1. Shaded (■) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during stop mode.

1 6 Demodulator-Platte
Demodulator Circuit Board

R57
L LEVEL

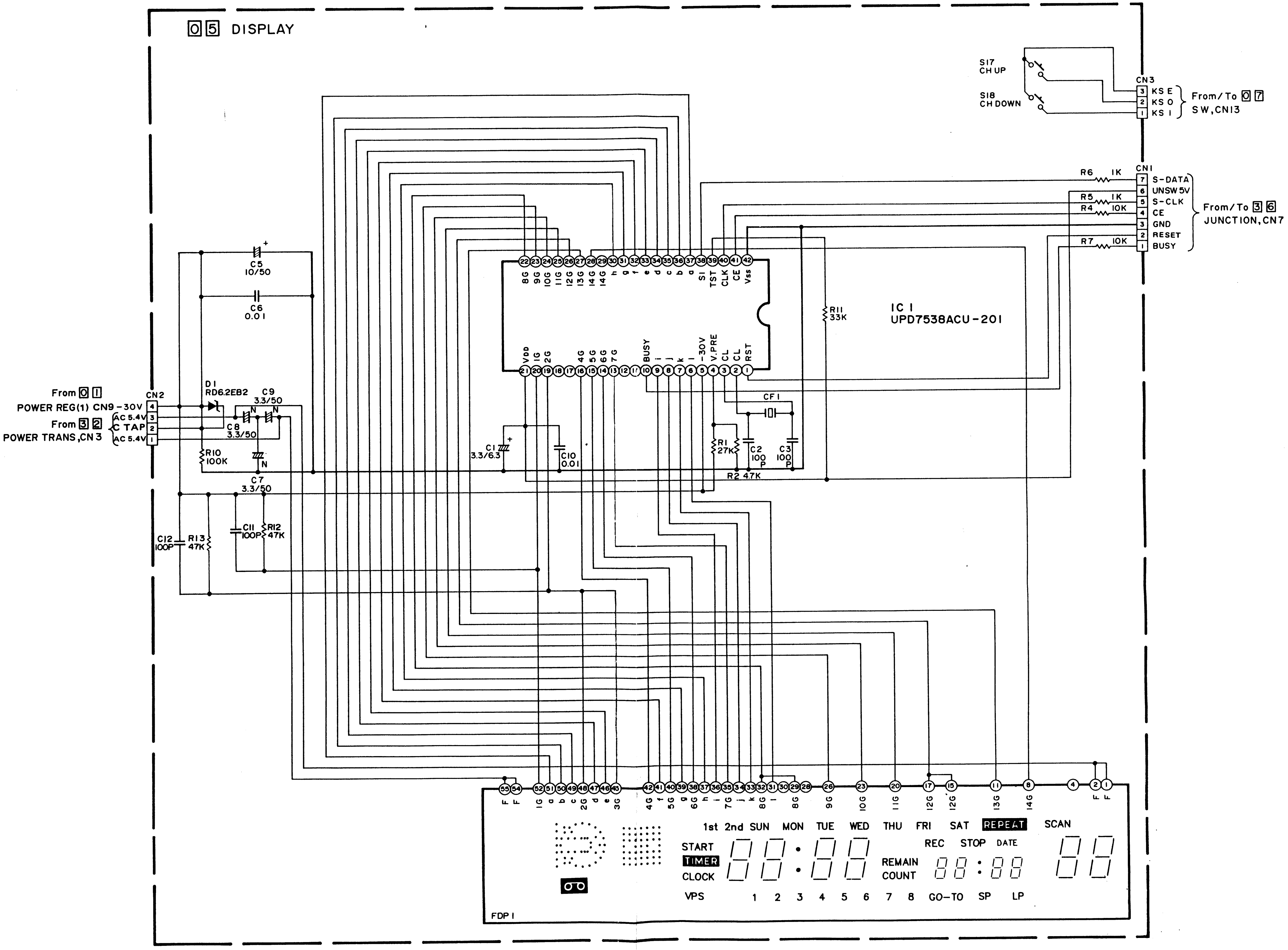
R62
R LEVEL



R19
Q5
E
B
C61
R47
CN3
R63
Q16
R64
C58
C57
CN2
R59
CN1
Q15
R58
R62
R57
T8
C66
T7
C65
R56
R53
R75
Q18
R86
R85
C63
R74
Q17
R76
R73
C64
Q19
D5
Q12
D6
R67
R84
D2
Q14
R55
Q13
R54
R51
R52
Q11
C62
C49
C53
C43
R44
C52
L7
B27
IC2
C50
R48
C51
T6
C47
C46
R46
T5
C56
C54
BPF1
C55
L8
L4
C42
C41
C39
C38
C37
C30
R31
CF4
R36
C26
R45
C24
CF5
C29
C45
R28
R82
Q4
R27
R26
R30
C27
L5
C32
IC1
C21
C17
B7
R81
C28
C31
L9
C24
C23
R22
R24
T3
T4
CN4
C1
R14
R23
R21
C12
R9
Q3
R13
R12
R78
C13
C14
SAW1
R11
L1
L3
R17
C16
C18
C19
C22
CF2
CF1
C15
R15
R16
1 6 PU22317A-01
DEMOD PWB ASS'Y

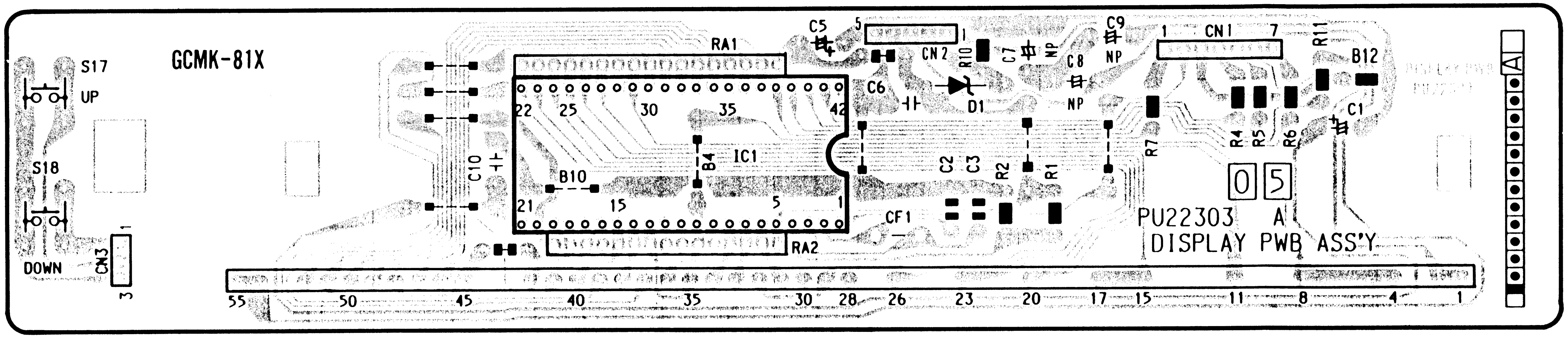
R31
SEPARATION

0 5 Anzeige-Schaltung
Display Schematic Diagram

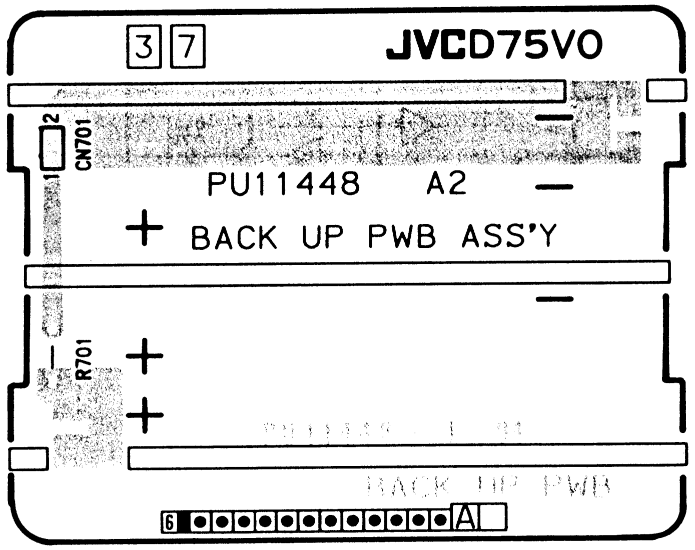


0 5 DISPLAY
S17 CH UP
S18 CH DOWN
CN3
3 KS E
2 KS O
1 KS I
From/To 0 7 SW,CN13
R6 1K
R5 1K
R4 10K
R7 10K
CN1
7 S-DATA
6 UNSW 5V
5 S-CLK
4 CE
3 GND
2 RESET
1 BUSY
From/To 3 6 JUNCTION,CN7
C5 10/50
C6 0.01
IC 1 UPD7538ACU-201
R11 33K
8G 9G 10G 11G 12G 13G 14G 14G h g f e d c b a SI TST CLK CE Vss
VDD 1G 2G 4G 5G 6G 7G BUSY i j k l -30V V.PRE CL CL RST
From 0 1 POWER REG(1) CN9 -30V
From 3 2 POWER TRANS,CN3
AC 5.4V
C TAP
AC 5.4V
CN2
D1 RD6.2EB2
C9 3.3/50
C8 3.3/50
R10 100K
C7 3.3/50
C1 3.3/6.3
C10 0.01
CF1
R1 27K
C2 100P
C3 100P
R2 4.7K
C12 100P
R13 47K
C11 100P
R12 47K
F F 1G a b c 2G d e 3G 4G f 5G g 6G h i 7G j k 8G l 8G 9G 10G 11G 12G 12G 13G 14G F F
1st 2nd SUN MON TUE WED THU FRI SAT REPEAT SCAN
START TIMER CLOCK
REC STOP DATE
REMAIN COUNT
VPS 1 2 3 4 5 6 7 8 GO-TO SP LP
FDP 1

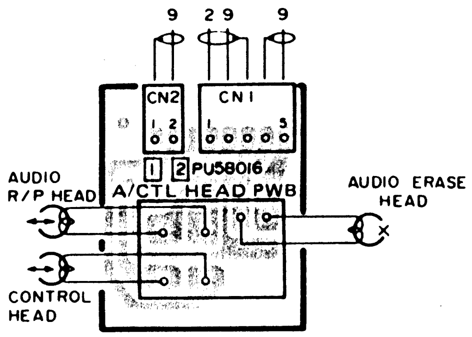
0 5 Anzeige-Platte
Display Circuit Board


GCMK-81X
S17
UP
S18
DOWN
CN3
1
3
C10
B10
IC1
B4
RA1
RA2
22
25
30
35
42
21
15
5
1
C5
5
CN2
1
R10
C7
NP
C6
D1
C8
NP
C9
NP
CN1
1
7
R11
B12
C1
R4
R5
R6
R7
C2
C3
R2
R1
CF1
0 5
PU22303 A
DISPLAY PWB ASS'Y
55
50
45
40
35
30
28
26
23
20
17
15
11
8
4
1
A

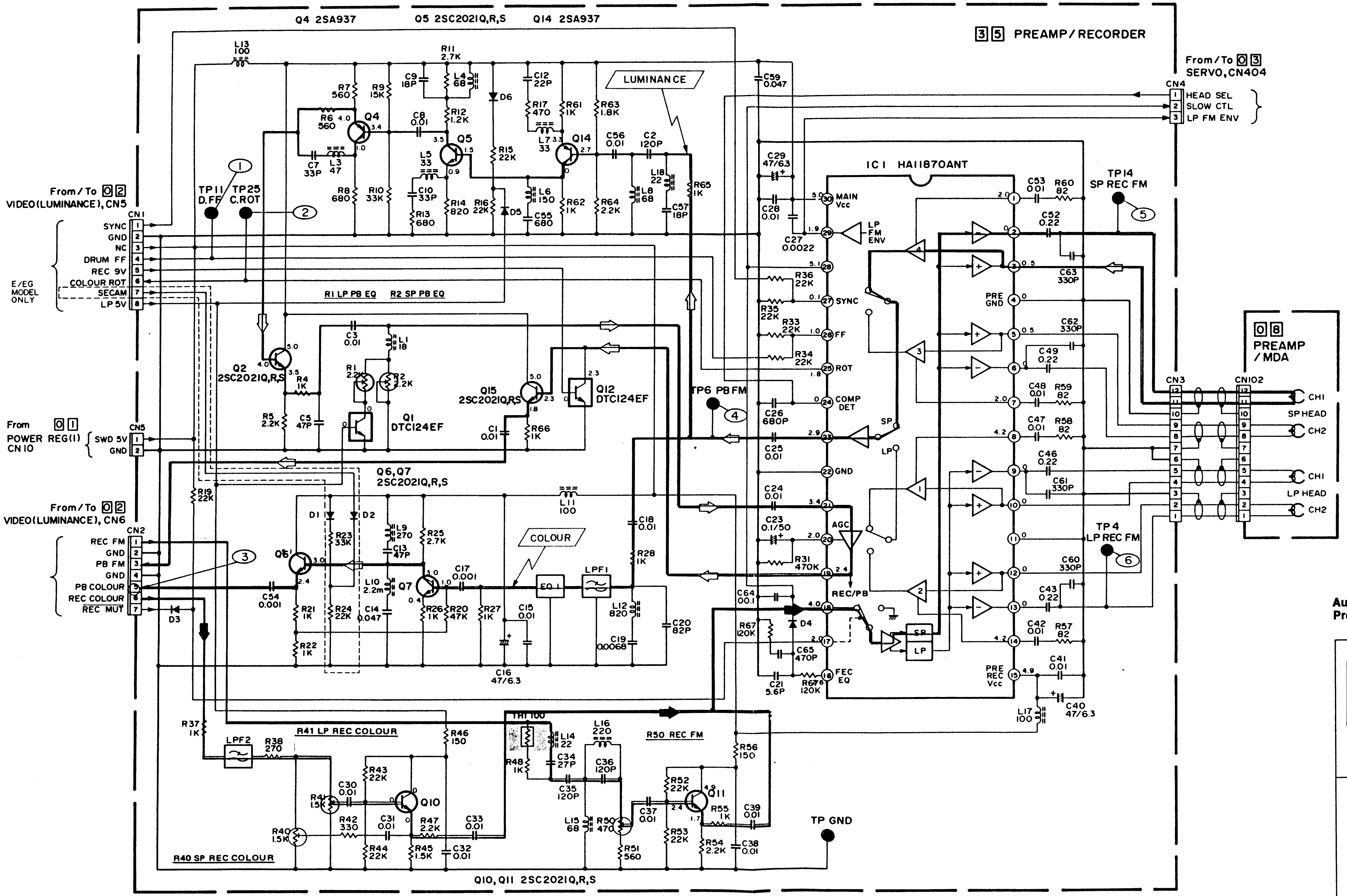
3 7 Speicher-Platte
Back up Circuit Board


3 7
JVCD75V0
CN701
2
1
PU11448 A2
+
BACK UP PWB ASS'Y
−
R701
+
+
6
A

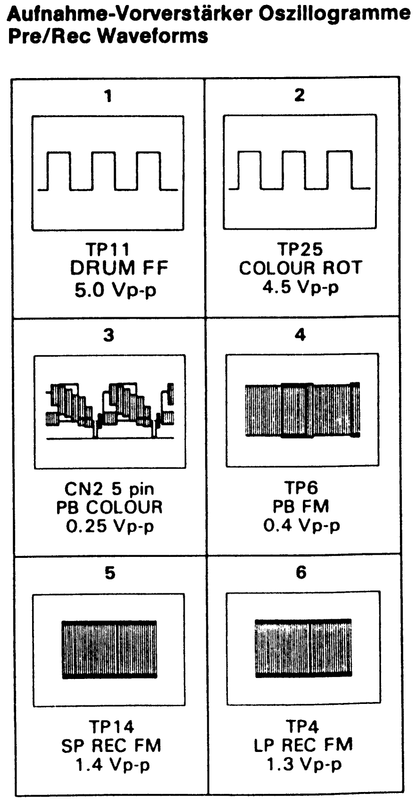
1 2 Audio/Synchronkopf-Platte
A/CTL head Circuit Board


9
2 9
9
CN2
CN1
1 2
1
5
1 2 PU58016
A/CTL HEAD PWB
AUDIO R/P HEAD
AUDIO ERASE HEAD
CONTROL HEAD

3 5 Aufnahme-Vorverstärker Schaltung
Pre/Rec Schematic Diagram



3 5 PREAMP / RECORDER
Q4 2SA937
Q5 2SC2021Q,R,S
Q14 2SA937
LUMINANCE
COLOUR
IC1 HA11870ANT
From / To 0 2 VIDEO (LUMINANCE), CN5
CN1
SYNC
GND
NC
DRUM FF
REC 9V
COLOUR ROT
SECAM
LP 5V
E/EG MODEL ONLY
TP11 D.FF
TP25 C.ROT
From 0 1 POWER REG(1) CN10
CN5
SWD 5V
GND
From / To 0 2 VIDEO (LUMINANCE), CN6
CN2
REC FM
GND
PB FM
GND
PB COLOUR
REC COLOUR
REC MUT
From / To 0 3 SERVO, CN404
CN4
HEAD SEL
SLOW CTL
LP FM ENV
0 8 PREAMP / MDA
CN3
CN102
CH1
SP HEAD
CH2
CH1
LP HEAD
CH2
TP14 SP REC FM
TP4 LP REC FM
TP6 PB FM
TP GND
MAIN Vcc
LP FM ENV
SYNC
FF
ROT
COMP DET
GND
AGC
REC/PB
FEC EQ
PRE GND
PRE REC Vcc
SP
LP
Q2 2SC2021Q,R,S
Q1 DTC124EF
Q15 2SC2021Q,R,S
Q12 DTC124EF
Q6,Q7 2SC2021Q,R,S
Q10
Q11
Q10, Q11 2SC2021Q,R,S
R1 LP PB EQ
R2 SP PB EQ
R41 LP REC COLOUR
R40 SP REC COLOUR
R50 REC FM
LPF1
LPF2
EQ 1
TH1 100
D1
D2
D3
D4
D5
D6



Aufnahme-Vorverstärker Oszillogramme
Pre/Rec Waveforms

TP11 DRUM FF 5.0 Vp-p	TP25 COLOUR ROT 4.5 Vp-p
CN2 5 pin PB COLOUR 0.25 Vp-p	TP6 PB FM 0.4 Vp-p
TP14 SP REC FM 1.4 Vp-p	TP4 LP REC FM 1.3 Vp-p

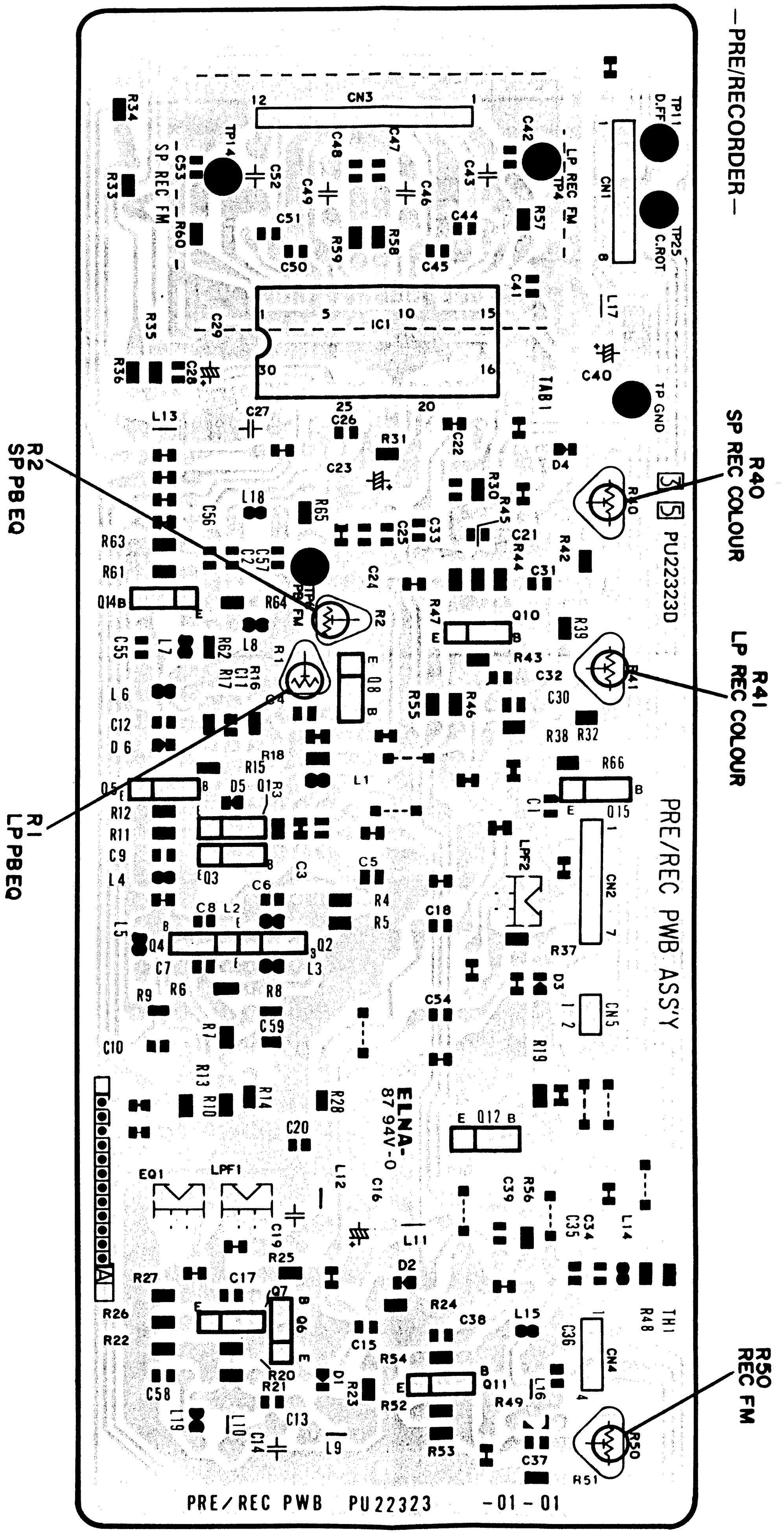
Alle Gleichspannungen sind mit einem Digitalvoltmeter im Wiedergabe-Betrieb gemessen.

▨ Grau unterlegte Bauteile sind Sicherheitsbauteile und dürfen nur durch Originalteile ersetzt werden!

NOTES:

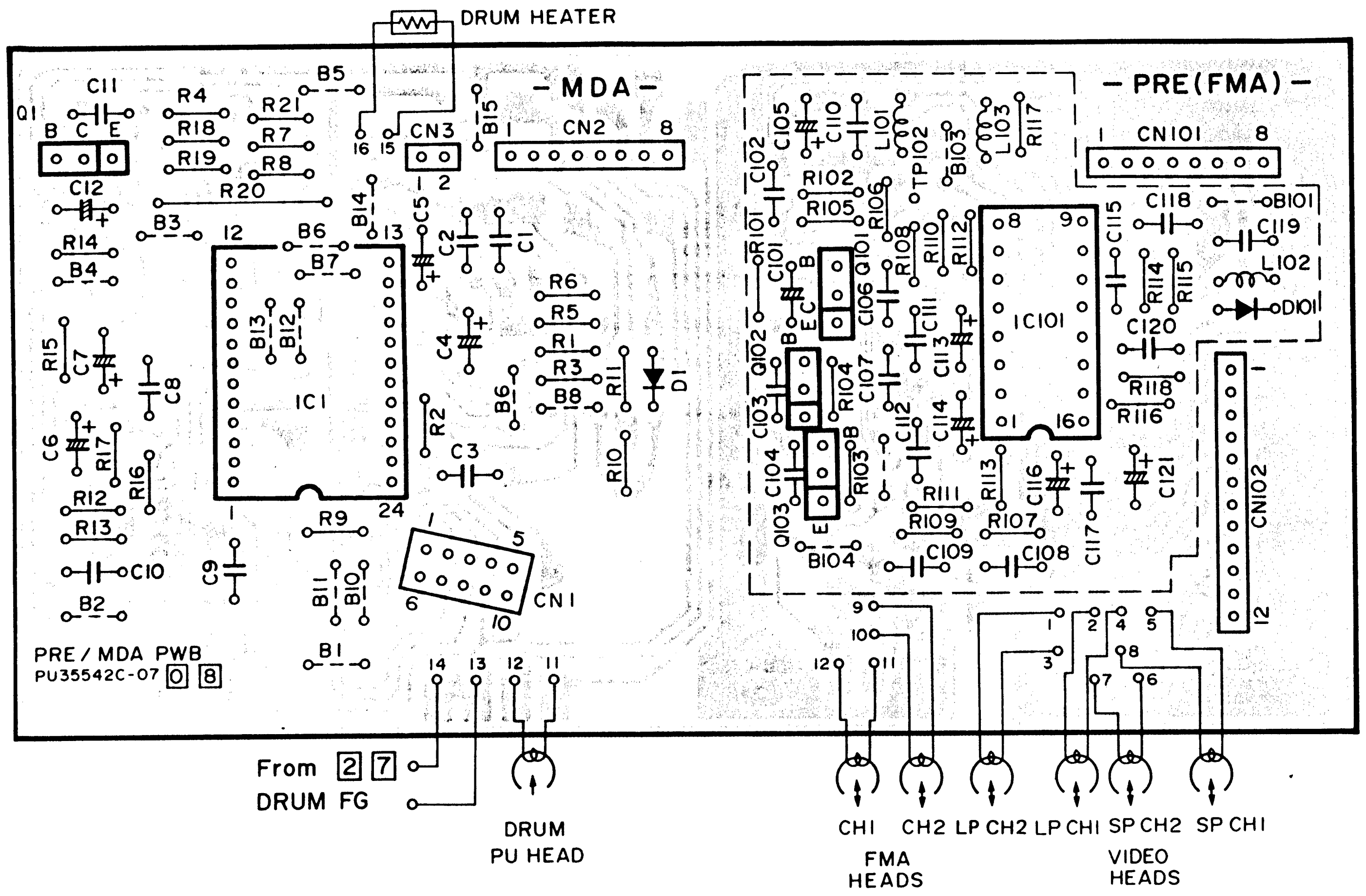
1. Shaded (▀) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during PLAY BACK mode.

3 5 Aufnahme-Vorverstärker Platte
Pre/Rec Circuit Boards

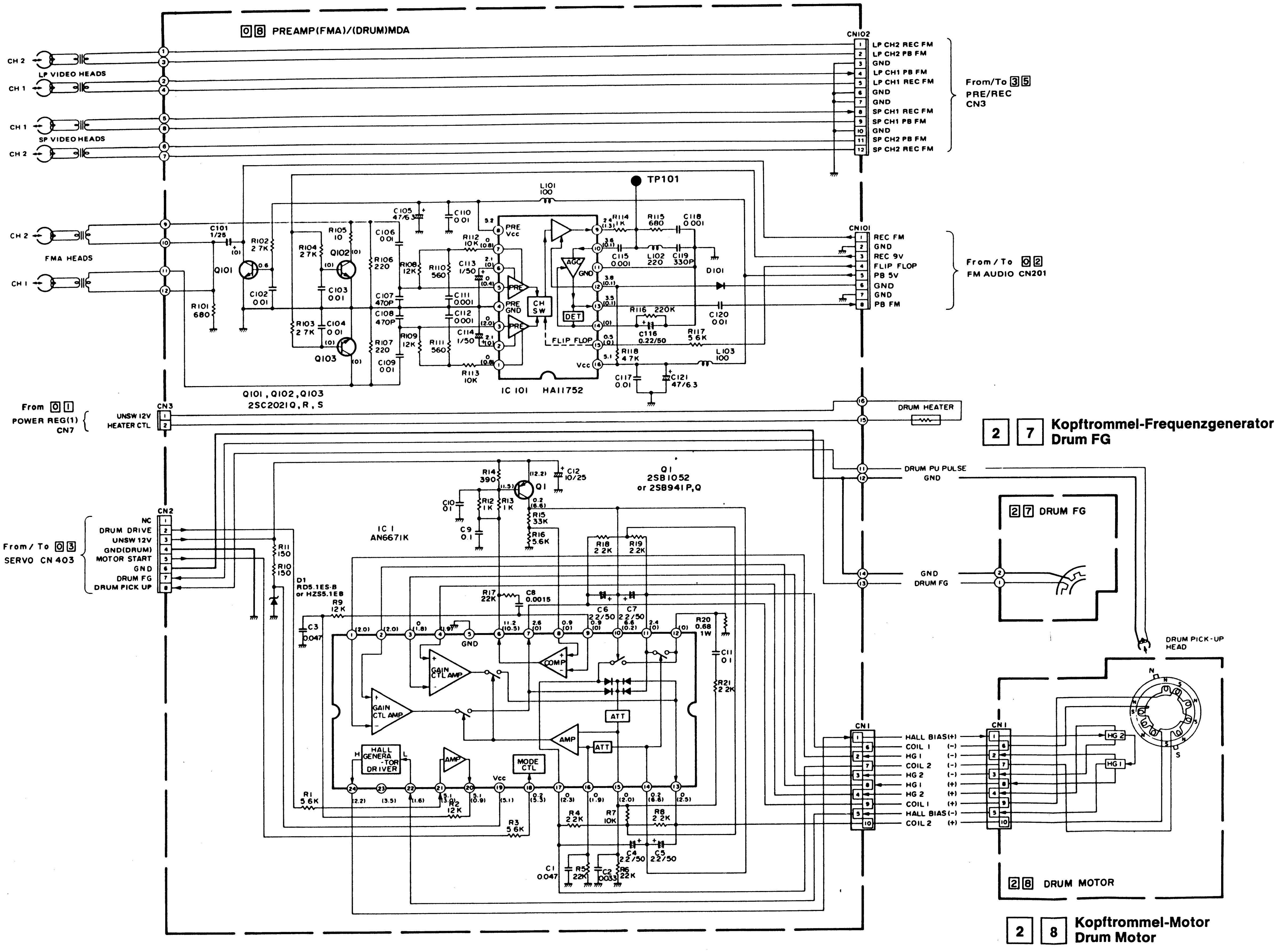

-PRE/RECORDER-
R40 SP REC COLOUR
R41 LP REC COLOUR
R50 REC FM
R2 SP PBEQ
R1 LP PBEQ
PRE/REC PWB ASS'Y
PU22323D
PRE/REC PWB PU22323 -01-01
ELNA-87 94V-0
CN1
CN2
CN3
CN4
CN5
IC1
TP11 D.FF
TP25 C.ROT
TP GND
TP14 SP REC FM
TP4 LP REC FM
EQ1
LPF1
LPF2

0 8

Vorverstärker/Kopftrommel MDA-Platte
Pre Amp/Drum MDA Circuit Boards


DRUM HEATER
- MDA -
- PRE(FMA) -
Q1
B C E
C11
C12
R4
R18
R19
R21
R7
R8
R20
B5
B3
B4
R14
R15
C7
C8
C6
R17
R16
R12
R13
C10
B2
C9
IC1
12
13
24
1
B6
B7
B13
B12
B14
B15
CN3
1 - 2
16 15
CN2
1
8
C5
C2
C1
C4
R6
R5
R1
R3
B8
R11
D1
R2
C3
R10
R9
CN1
1
5
6
10
B11
B10
B1
PRE / MDA PWB
PU35542C-07 0 8
C102
C105
C110
L101
TP102
B103
L103
R117
R102
R105
R106
R101
C101
R108
R110
R112
Q101
C106
B
E
C
Q102
C103
R104
C107
C111
C113
C112
C114
C104
Q103
R103
R111
R113
R109
R107
B104
C109
C108
C116
C117
C121
IC101
8
9
1
16
CN101
1
8
C115
C118
B101
C119
L102
R114
R115
D101
C120
R118
R116
CN102
12
14 13 12 11
9
10
12 11
1 2 4 5
3
8
7 6
From 2 7
DRUM FG
DRUM
PU HEAD
CH1
CH2
LP CH2
LP CH1
SP CH2
SP CH1
FMA
HEADS
VIDEO
HEADS

0 8 Vorverstärker/Kopftrommel MDA-Schaltung
Pre AMp/Drum MDA Schematic Diagram



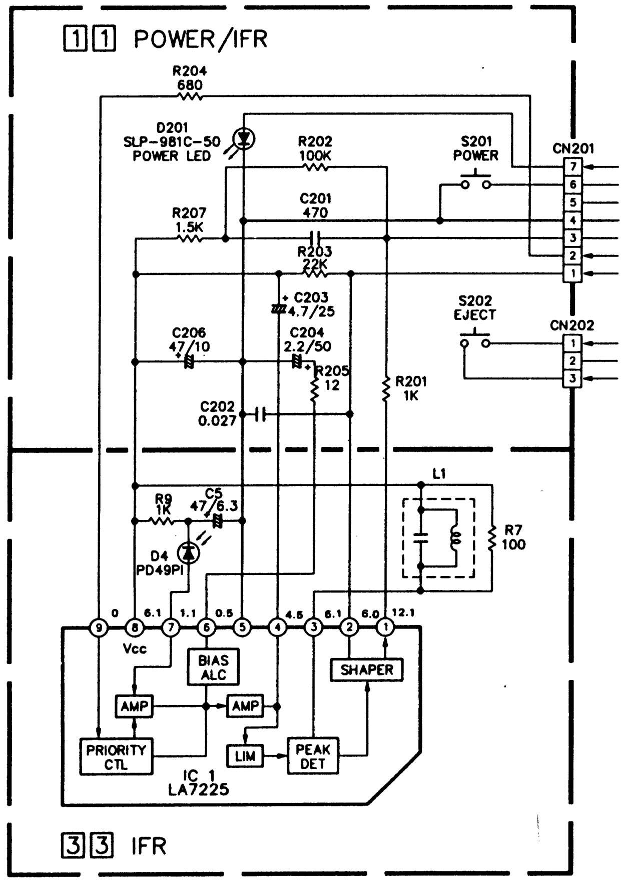
08 PREAMP(FMA)/(DRUM)MDA
CH 2
LP VIDEO HEADS
CH 1
CH 1
SP VIDEO HEADS
CH 2
CN102
LP CH2 REC FM
LP CH2 PB FM
GND
LP CH1 PB FM
LP CH1 REC FM
GND
GND
SP CH1 REC FM
SP CH1 PB FM
GND
SP CH2 PB FM
SP CH2 REC FM
From/To 35
PRE/REC
CN3
TP101
L101 100
CH 2
FMA HEADS
CH 1
C101 1/25
R101 680
Q101
R102 2.7K
C102 0.01
R103 2.7K
R104 27K
R105 10
Q102
C103 0.01
C104 0.01
Q103
R106 220
R107 220
C105 47/63
C106 0.01
C107 470P
C108 470P
C109 0.01
R108 12K
R109 12K
R110 560
R111 560
C110 0.01
C111 0.001
C112 0.001
C113 1/50
C114 1/50
R112 10K
R113 10K
PRE Vcc
PRE GND
PRE
CH SW
AGC
GND
DET
FLIP FLOP
Vcc
IC 101 HA11752
R114 1K
R115 680
C118 0.001
C115 0.001
L102 220
C119 330P
D101
R116 220K
C116 0.22/50
R117 5.6K
C120 0.01
R118 4.7K
L103 100
C117 0.01
C121 47/63
CN101
REC FM
GND
REC 9V
FLIP FLOP
PB 5V
GND
GND
PB FM
From / To 02
FM AUDIO CN201
Q101, Q102, Q103
2SC2021Q, R, S
From 01
POWER REG(1)
CN7
UNSW 12V
HEATER CTL
CN3
DRUM HEATER
DRUM PU PULSE
GND
GND
DRUM FG
27 DRUM FG
R14 390
C12 10/25
Q1
Q1
2SB1052
or 2SB941P,Q
C10 0.1
R12 1K
R13 1K
R15 33K
R16 5.6K
C9 0.1
IC 1
AN6671K
CN2
NC
DRUM DRIVE
UNSW 12V
GND(DRUM)
MOTOR START
GND
DRUM FG
DRUM PICK UP
From / To 03
SERVO CN 403
R11 150
R10 150
D1
RD5.1ES-B
or HZS5.1EB
R9 12K
C3 0.047
R17 22K
C8 0.0015
R18 2.2K
R19 2.2K
C6 22/50
C7 22/50
R20 0.68 1W
C11 0.1
R21 2.2K
GND
GAIN CTL AMP
GAIN CTL AMP
COMP
ATT
ATT
AMP
AMP
HALL GENERATOR DRIVER
MODE CTL
Vcc
R1 5.6K
R2 12K
R3 5.6K
R4 2.2K
R7 10K
R8 2.2K
C4 22/50
C5 22/50
C1 0.047
R5 22K
C2 0.033
R6 22K
CN1
HALL BIAS(+)
COIL 1 (−)
HG 1 (−)
COIL 2 (−)
HG 2 (−)
HG 1 (+)
HG 2 (+)
COIL 1 (+)
HALL BIAS(−)
COIL 2 (+)
DRUM PICK-UP HEAD
HG 2
HG 1
N
S
28 DRUM MOTOR

2 7 Kopftrommel-Frequenzgenerator
Drum FG

2 8 Kopftrommel-Motor
Drum Motor

3 6 Verbindungs-Schaltung
Junction Schematic Diagram

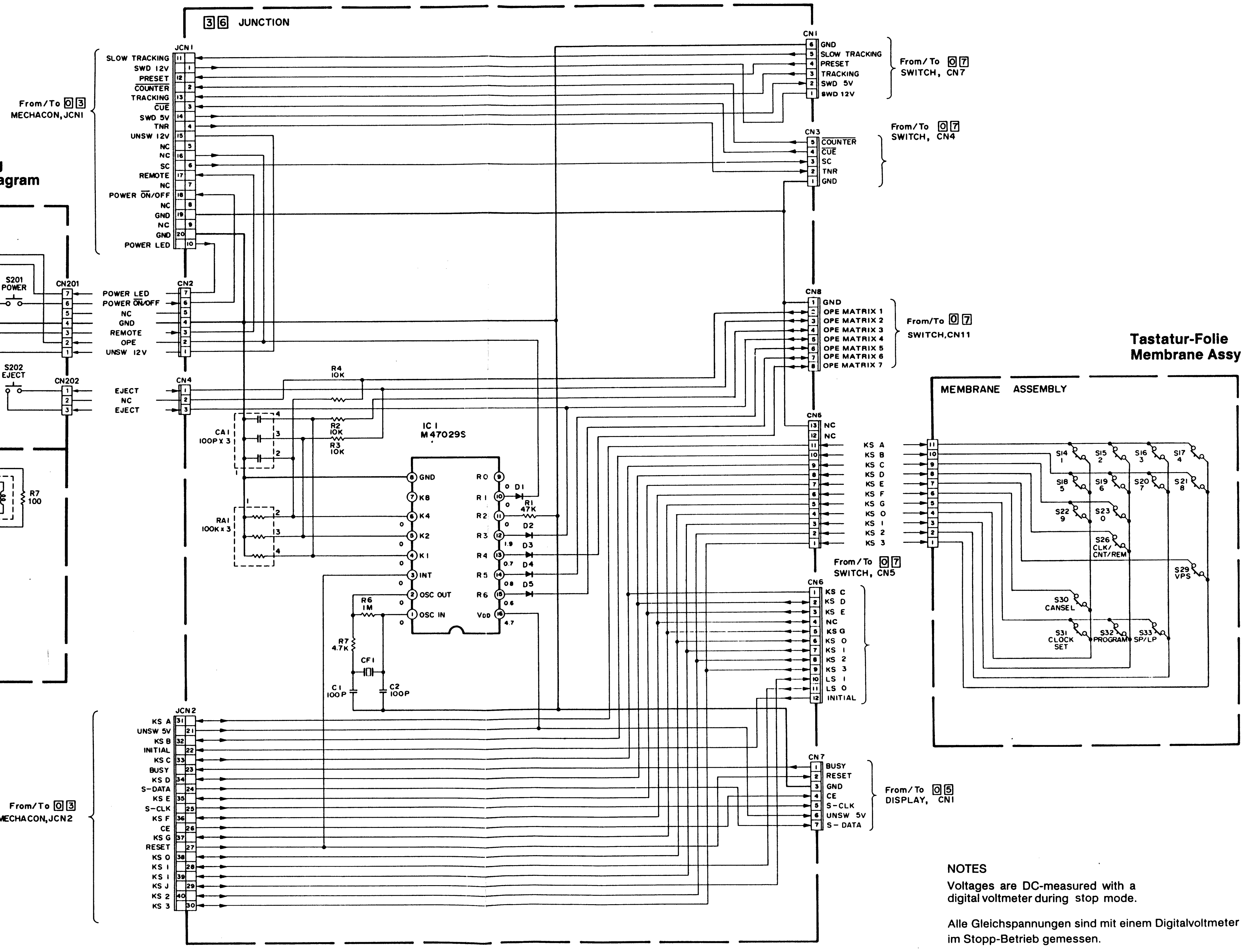
1 1 Power/Infrarot-Schaltung
Power/IFR Schematic Diagram



1 1 POWER/IFR
R204 680
D201 SLP-981C-50 POWER LED
R202 100K
S201 POWER
CN201
C201 470
R207 1.5K
R203 22K
C203 4.7/25
C206 47/10
C204 2.2/50
R205 12
R201 1K
C202 0.027
S202 EJECT
CN202
L1
R9 1K
C5 47/6.3
D4 PD49PI
R7 100
0
6.1
1.1
0.5
4.6
6.1
6.0
12.1
Vcc
BIAS ALC
SHAPER
AMP
AMP
PRIORITY CTL
LIM
PEAK DET
IC 1 LA7225
3 3 IFR

3 3 Infrarot-Schaltung
IFR Schematic Diagram

Tastatur-Folie
Membrane Assy



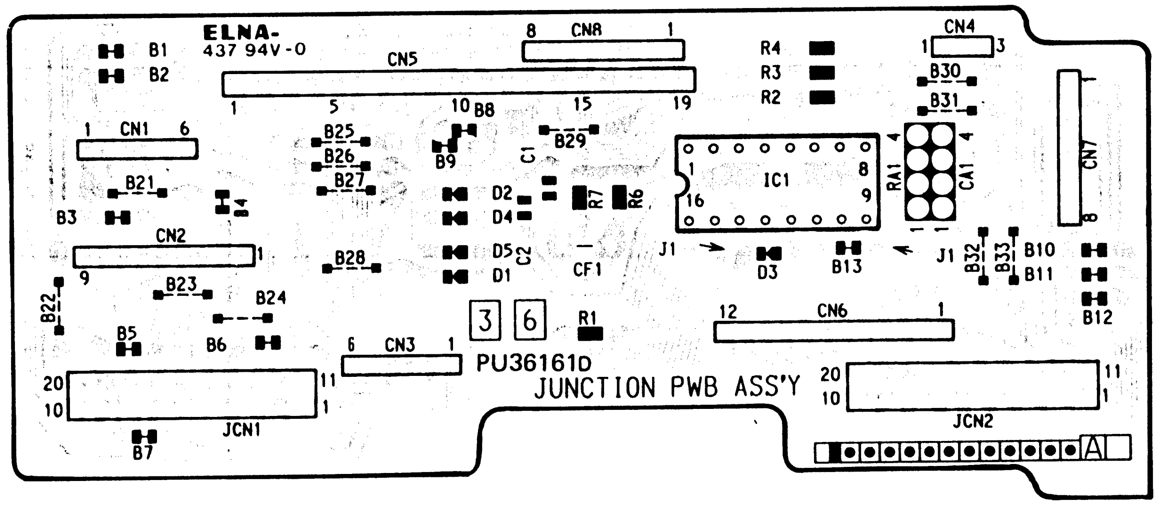
3 6 JUNCTION
From/To 0 3 MECHACON, JCN1
JCN1
SLOW TRACKING
SWD 12V
PRESET
COUNTER
TRACKING
CUE
SWD 5V
TNR
UNSW 12V
NC
NC
SC
REMOTE
NC
POWER ON/OFF
NC
GND
NC
GND
POWER LED
CN1
GND
SLOW TRACKING
PRESET
TRACKING
SWD 5V
SWD 12V
From/To 0 7 SWITCH, CN7
CN3
COUNTER
CUE
SC
TNR
GND
From/To 0 7 SWITCH, CN4
CN2
POWER LED
POWER ON/OFF
NC
GND
REMOTE
OPE
UNSW 12V
CN8
GND
OPE MATRIX 1
OPE MATRIX 2
OPE MATRIX 3
OPE MATRIX 4
OPE MATRIX 5
OPE MATRIX 6
OPE MATRIX 7
From/To 0 7 SWITCH, CN11
CN4
EJECT
NC
EJECT
R4 10K
R2 10K
R3 10K
CA1 100P x 3
RA1 100K x 3
IC 1 M47029S
GND
K8
K4
K2
K1
INT
OSC OUT
OSC IN
R0
R1
R2
R3
R4
R5
R6
VDD
D1
R1 47K
D2
D3
D4
D5
R6 1M
R7 4.7K
CF1
C1 100P
C2 100P
CN5
NC
NC
KS A
KS B
KS C
KS D
KS E
KS F
KS G
KS 0
KS 1
KS 2
KS 3
From/To 0 7 SWITCH, CN5
CN6
KS C
KS D
KS E
NC
KS G
KS 0
KS 1
KS 2
KS 3
LS 1
LS 0
INITIAL
From/To 0 3 MECHACON, JCN2
JCN2
KS A
UNSW 5V
KS B
INITIAL
KS C
BUSY
KS D
S-DATA
KS E
S-CLK
KS F
CE
KS G
RESET
KS 0
KS 1
KS 1
KS J
KS 2
KS 3
CN7
BUSY
RESET
GND
CE
S-CLK
UNSW 5V
S-DATA
From/To 0 5 DISPLAY, CN1
MEMBRANE ASSEMBLY
S14 1
S15 2
S16 3
S17 4
S18 5
S19 6
S20 7
S21 8
S22 9
S23 0
S26 CLK/CNT/REM
S29 VPS
S30 CANSEL
S31 CLOCK SET
S32 PROGRAM
S33 SP/LP

NOTES

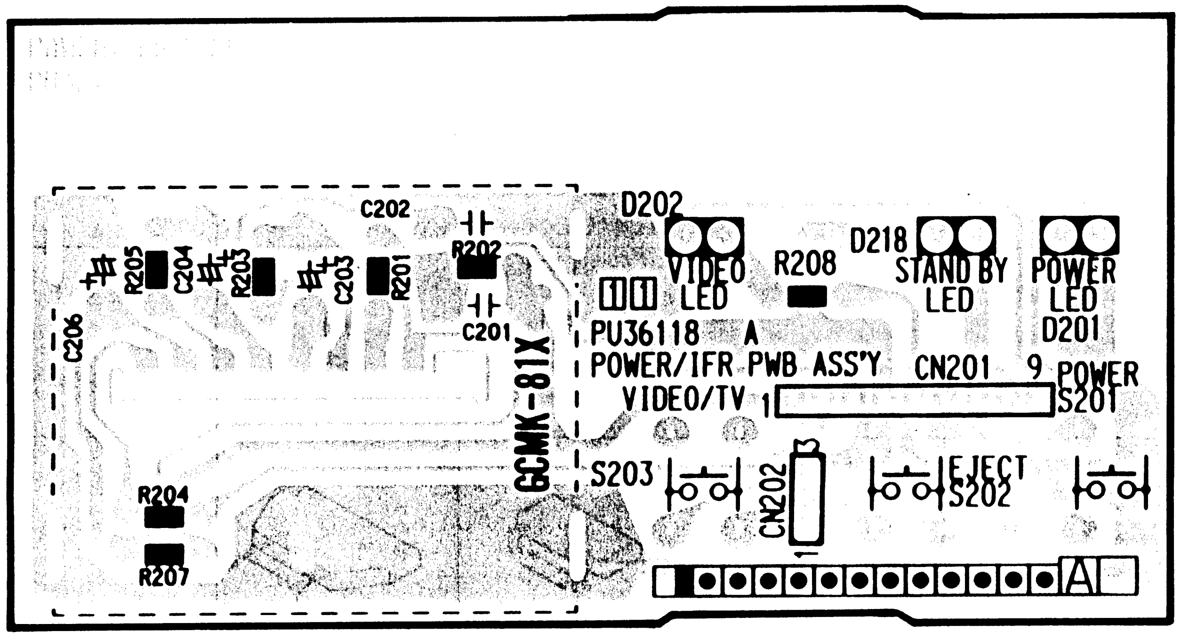
Voltages are DC-measured with a digital voltmeter during stop mode.

Alle Gleichspannungen sind mit einem Digitalvoltmeter im Stopp-Betrieb gemessen.

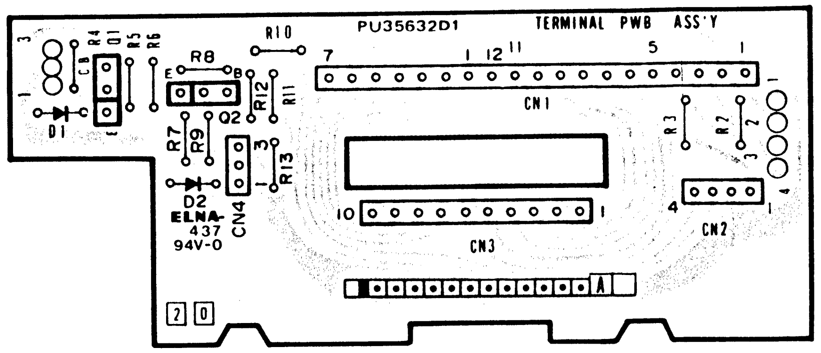
3 6 Verbindungs-Platte
Junction Circuit Board


ELNA-
437 94V-0
CN5
CN8
CN4
CN1
CN2
CN3
CN6
CN7
IC1
CF1
J1
JCN1
JCN2
3 6
R1
PU36161D
JUNCTION PWB ASS'Y
A

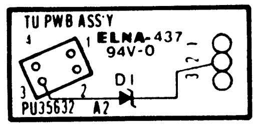
1 1 Power/Infrarot-Platte
Power/IFR Circuit Board


C202
D202
R202
R201
R203
R204
R205
R207
R208
C201
C203
C204
C206
GCMK-81X
1 1
VIDEO LED
D218
STAND BY LED
POWER LED
D201
PU36118 A
POWER/IFR PWB ASS'Y
CN201
VIDEO/TV
POWER S201
S203
CN202
EJECT S202
A

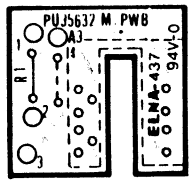
2 0 Laufwerk-Anschlußplatte
Deck Terminal Circuit Board


PU35632D1
TERMINAL PWB ASS'Y
R10
R8
CN1
CN2
CN3
CN4
D1
D2
ELNA-437 94V-0
2 0
A

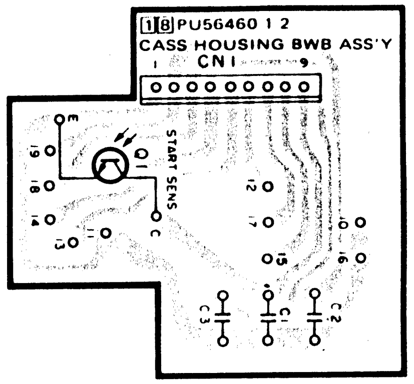
2 2 Aufwickelteller-Sensor
Take up Sensor


TU PWB ASS'Y
ELNA-437
94V-0
D1
PU35632 A2

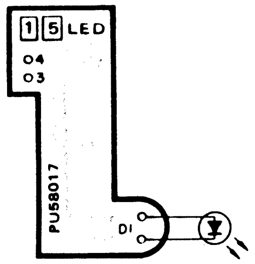
1 4 Fädel/Steuer-Sensor
Loading/Mode Sensor


PU35637 M PWB
R1
ELNA-437 94V-0

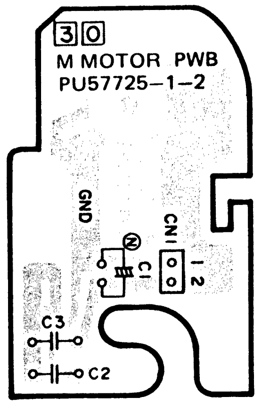
1 8 Cassettenschacht-Sensor
Cassette Housing Sensor


1 8 PU56460 1 2
CASS HOUSING BWB ASS'Y
CN1
START SENS

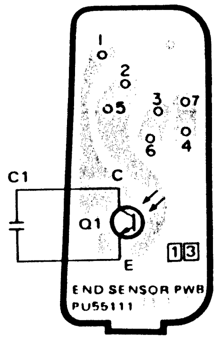
1 5 Cassetten LED
Cassette LED


1 5 LED
D4
D3
PU58017
D1

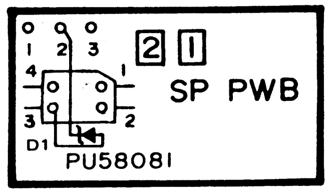
3 0 Fädel/Steuermotor
Load/Mode Motor


3 0
M MOTOR PWB
PU57725-1-2
GND
CN1
C1
C2
C3

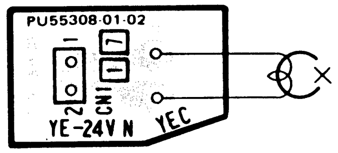
1 3 Bandende-Sensor
End Sensor


C1
Q1
C
E
1 3
END SENSOR PWB
PU55111

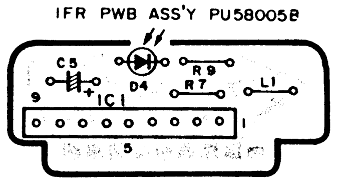
2 1 Abwickeltellersensor
Supply Sensor


2 1
SP PWB
D1
PU58081

1 7 Hauptlöschkopf
Full Erase Head

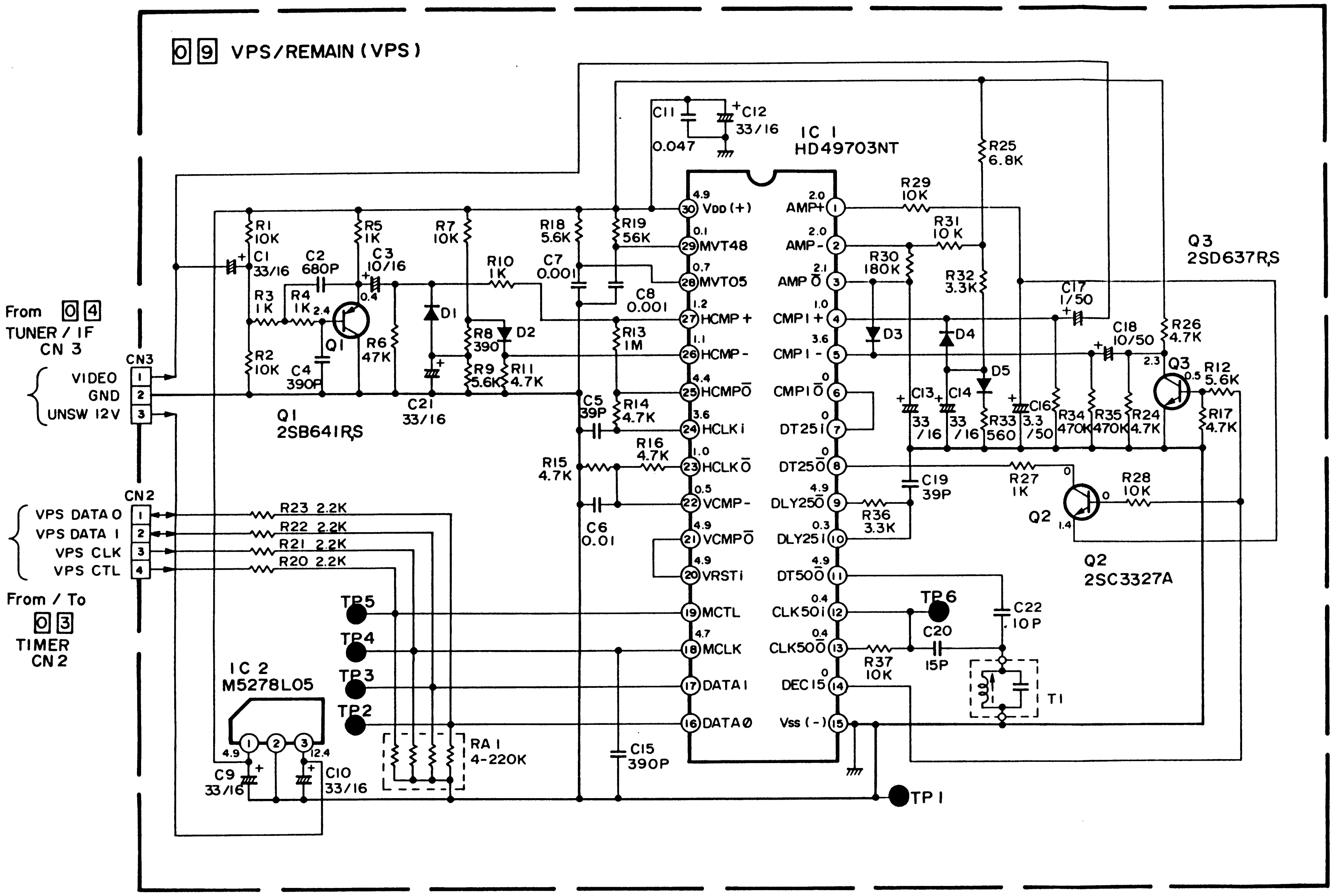

PU55308-01-02
1 7
CN1
YE-24V N
YEC

3 3 Infrarot-Platte
IFR Circuit Board


IFR PWB ASS'Y PU58005B
C5
IC1
D4
R9
R7
L1

0 9

VPS-Schaltung
VPS Schematic Diagram



09 VPS/REMAIN (VPS)
From 04 TUNER / IF CN 3
VIDEO
GND
UNSW 12V
CN3
CN2
VPS DATA 0
VPS DATA 1
VPS CLK
VPS CTL
From / To 03 TIMER CN 2
IC 1 HD49703NT
IC 2 M5278L05
Q1 2SB641RS
Q2 2SC3327A
Q3 2SD637RS
30 VDD (+)
29 MVT48
28 MVTO5
27 HCMP+
26 HCMP-
25 HCMPŌ
24 HCLKI
23 HCLKŌ
22 VCMP-
21 VCMPŌ
20 VRSTI
19 MCTL
18 MCLK
17 DATA1
16 DATA0
1 AMP+
2 AMP-
3 AMP O
4 CMP1+
5 CMP1-
6 CMP1Ō
7 DT25I
8 DT25Ō
9 DLY25Ō
10 DLY25I
11 DT50Ō
12 CLK50I
13 CLK50Ō
14 DEC15
15 Vss (-)
R1 10K
R2 10K
R3 1K
R4 1K
R5 1K
R6 47K
R7 10K
R8 390
R9 5.6K
R10 1K
R11 4.7K
R12 5.6K
R13 1M
R14 4.7K
R15 4.7K
R16 4.7K
R17 4.7K
R18 5.6K
R19 56K
R20 2.2K
R21 2.2K
R22 2.2K
R23 2.2K
R24 4.7K
R25 6.8K
R26 4.7K
R27 1K
R28 10K
R29 10K
R30 180K
R31 10K
R32 3.3K
R33 560
R34 470K
R35 470K
R36 3.3K
R37 10K
RA 1 4-220K
C1 33/16
C2 680P
C3 10/16
C4 390P
C5 39P
C6 0.01
C7 0.001
C8 0.001
C9 33/16
C10 33/16
C11 0.047
C12 33/16
C13 33/16
C14 33/16
C15 390P
C16 3.3/50
C17 1/50
C18 10/50
C19 39P
C20 15P
C21 33/16
C22 10P
D1
D2
D3
D4
D5
T1
TP1
TP2
TP3
TP4
TP5
TP6

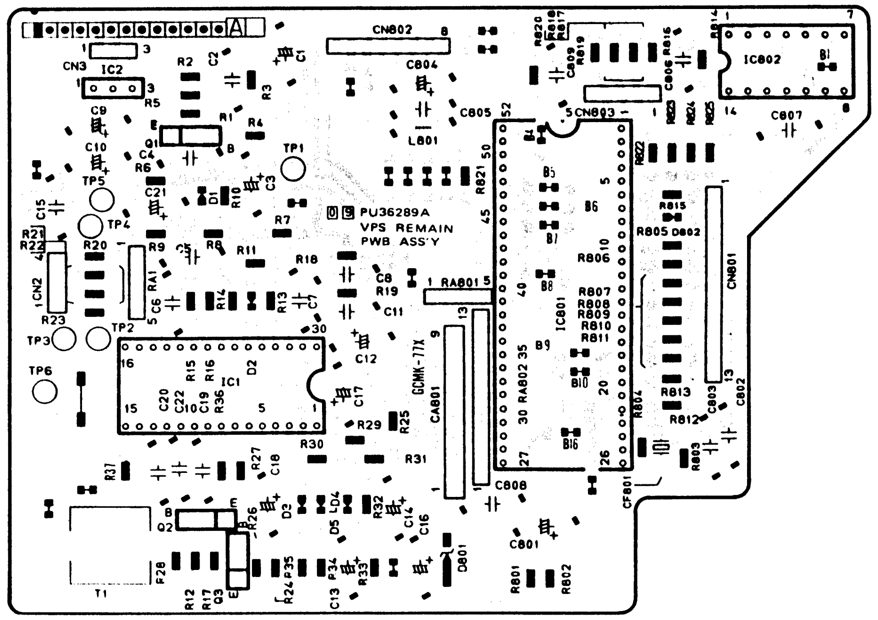
Alle Gleichspannungen sind mit einem Digitalvoltmeter im Stopp-Betrieb gemessen.

NOTE

Voltages are DC-measured with a digital voltmeter during stop mode.

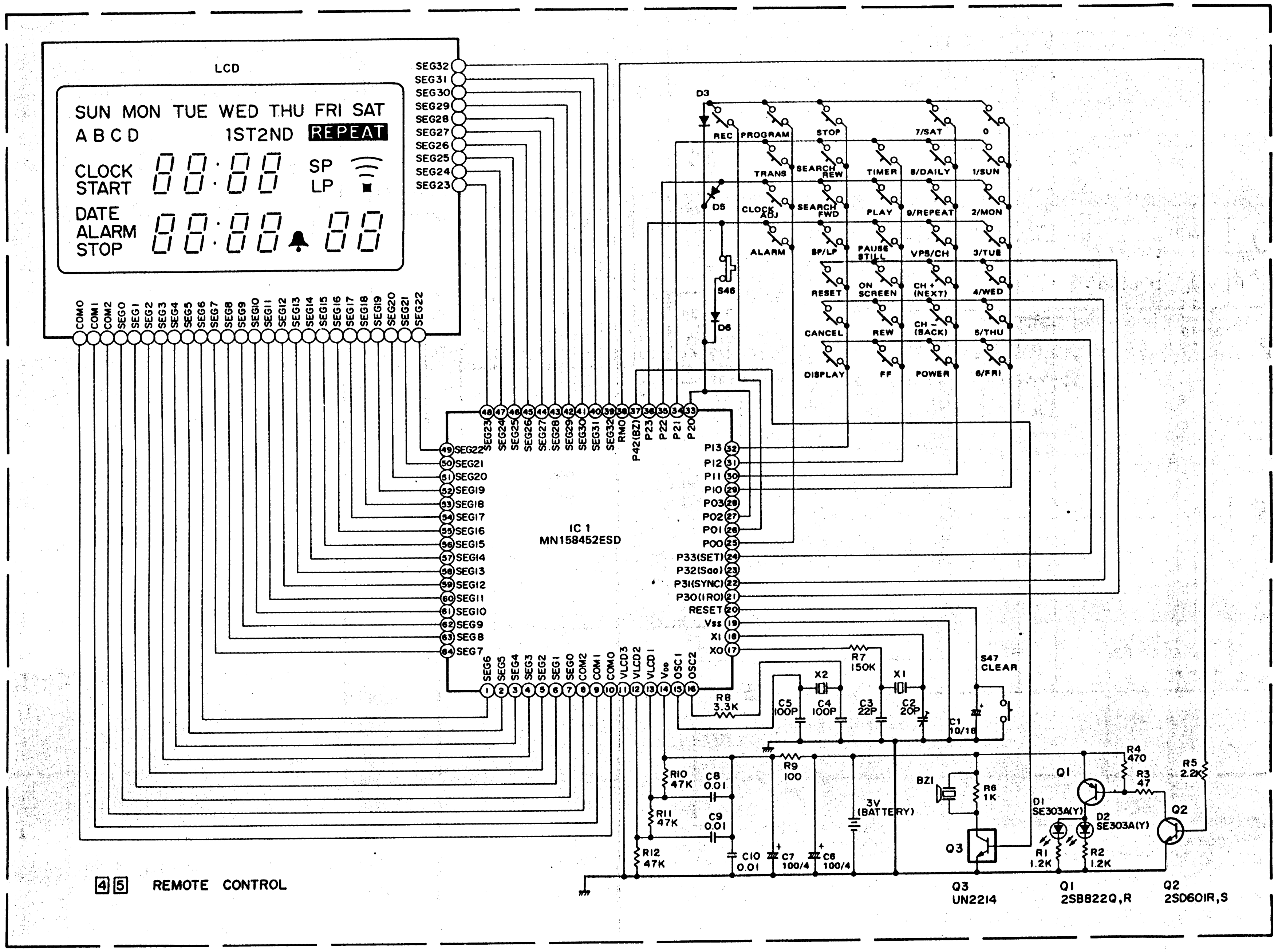
0 9

VPS-Platte
VPS Circuit Board



09 PU36289A VPS REMAIN PWB ASS'Y
CN802
CN803
CN801
IC802
IC801
IC1
IC2
CN2
CN3
CA801
RA801
RA802
GCMK-77X
L801
Q1
Q2
Q3
T1
TP1
TP2
TP3
TP4
TP5
TP6

4 5 Fernbedienungs-Sender
IFR Transmitter


LCD
SUN MON TUE WED THU FRI SAT
A B C D
1ST2ND
REPEAT
CLOCK
START
SP
LP
DATE
ALARM
STOP
SEG32
SEG31
SEG30
SEG29
SEG28
SEG27
SEG26
SEG25
SEG24
SEG23
COM0
COM1
COM2
SEG0
SEG1
SEG2
SEG3
SEG4
SEG5
SEG6
SEG7
SEG8
SEG9
SEG10
SEG11
SEG12
SEG13
SEG14
SEG15
SEG16
SEG17
SEG18
SEG19
SEG20
SEG21
SEG22
IC 1
MN158452ESD
RMO
P42(BZ)
P23
P22
P21
P20
P13
P12
P11
P10
P03
P02
P01
P00
P33(SET)
P32(Sdo)
P31(SYNC)
P30(IRO)
RESET
Vss
XI
XO
VLCD3
VLCD2
VLCD1
VDD
OSC1
OSC2
D3
D5
D6
S46
REC
PROGRAM
STOP
7/SAT
0
TRANS
SEARCH REW
TIMER
8/DAILY
1/SUN
CLOCK ADJ
SEARCH FWD
PLAY
9/REPEAT
2/MON
ALARM
SP/LP
PAUSE STILL
VPS/CH
3/TUE
RESET
ON SCREEN
CH + (NEXT)
4/WED
CANCEL
REW
CH − (BACK)
5/THU
DISPLAY
FF
POWER
6/FRI
S47
CLEAR
R7
150K
X1
X2
R8
3.3K
C5
100P
C4
100P
C3
22P
C2
20P
C1
10/16
R9
100
R10
47K
C8
0.01
R11
47K
C9
0.01
R12
47K
C10
0.01
C7
100/4
C6
100/4
3V
(BATTERY)
BZ1
R6
1K
R4
470
R3
47
R5
2.2K
Q1
Q2
Q3
D1
SE303A(Y)
D2
SE303A(Y)
R1
1.2K
R2
1.2K
Q3
UN2214
Q1
2SB822Q,R
Q2
2SD601R,S
4 5 REMOTE CONTROL

Transistoren
Transistors

Anschlußbelegung
Pin Connections

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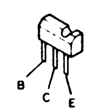
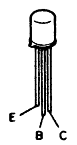
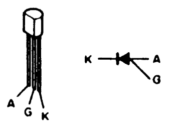
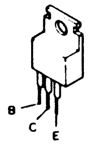
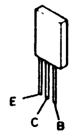
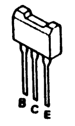
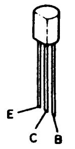
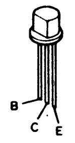
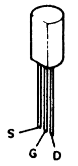
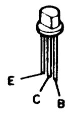
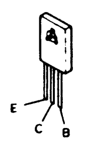
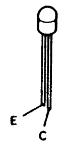
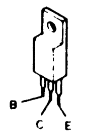
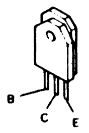
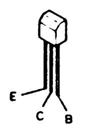
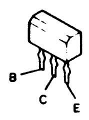
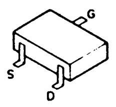
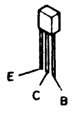
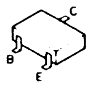
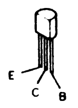
A					
B					
C					
D					
E					
F					
G					
H					
I					

Integrierte Schaltungen
Integrated Circuits

Anschlußbelegung
Pin Connections

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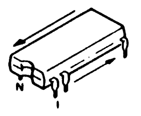
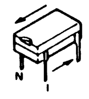
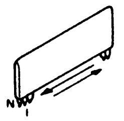
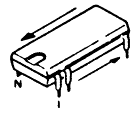
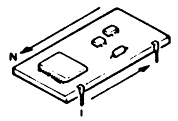
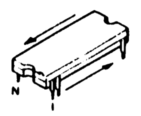
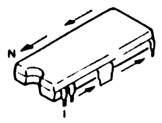
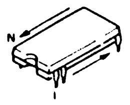
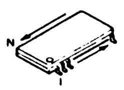
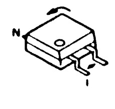
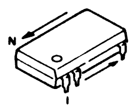
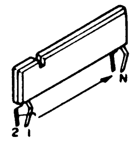
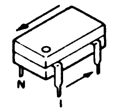
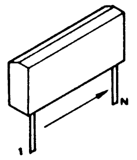
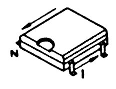
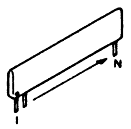
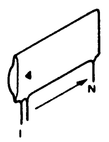
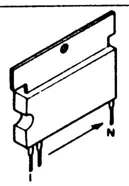
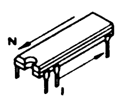
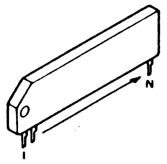
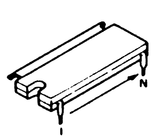
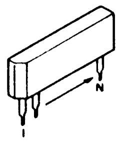
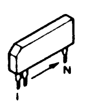
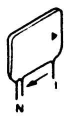
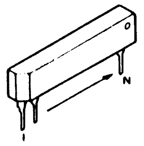
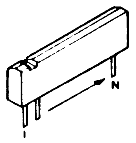
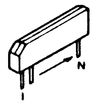
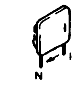
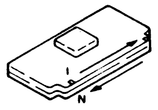
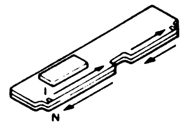
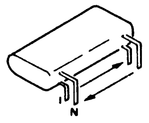
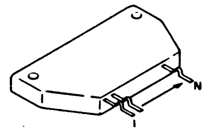
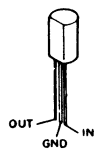
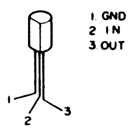
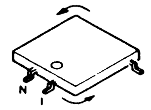
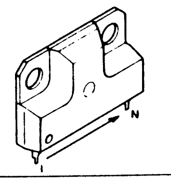
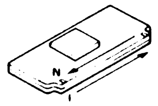
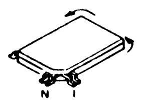
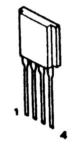
A					
B					
C					
D					
E					
F					
G					
H		 1 GND 2 IN 3 OUT 1 2 3			
I					

KUNDENDIENST

ITT Graetz

SERVICE

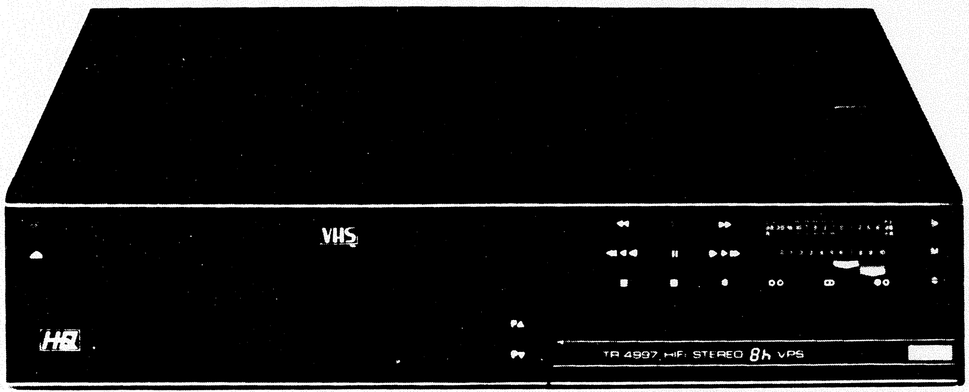
MANUAL

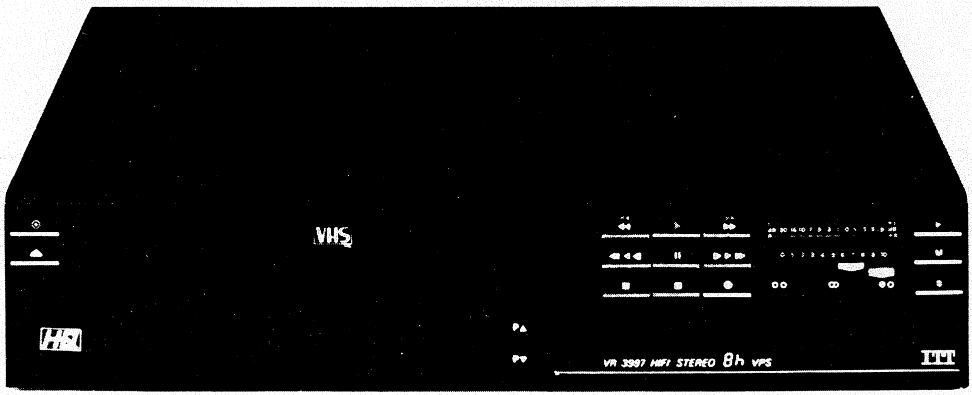
VIDEORECORDER 3997
TELERECORDER 4997
Hifi Oscar VPS

Teil 2+3 / Part 2+3

VR
133-
2+3
1986

Einstellanweisung der Mechanik und Elektronik
Mechanical and Electronic Adjustments
Ersatzteile-Listen
Spare Parts Lists
Explosions-Darstellungen
Exploded-View Diagrams





Für diese Geräte gelten folgende Manuale:

VR 133-1	Schaltbilder – Lagepläne Bestell-Nr. 6611 81 80
VR 133-2 + 3	Einstellanweisung der Mechanik und Elektronik Ersatzteile-Listen Bestell-Nr. 6611 81 81

For these models the following manuals apply:

VR 133-1	Schematic Diagrams – Circuit Boards Part. No. 6611 81 80
VR 133-2 + 3	Mechanical and Electronic Adjustments Spare Parts Lists Part. No. 6611 81 81

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Mechanische Ersatzteile
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Mechanischer Abgleich

1.1 Vor dem Abgleich

Die mechanischen Einstellungen sind nur nach Verschleiß oder Defekt eines mechanischen Teiles erforderlich. Da das mechanische und elektrische System in Beziehung zueinander stehen, bildet ein genauer mechanischer Abgleich die Referenz für den elektrischen Abgleich.
Für den Fall, daß das Laufwerk ohne Cassettenschacht betrieben werden muß, sollte er auf eine isolierte Unterlage gestellt werden. Die elektrische Verbindung zur Video/Ablaufsteuerung - und Servoplatte muß bestehen bleiben. Eine Cassette einlegen und die entsprechende Betriebsart wählen.

1.2 Erforderliche Lehren und Werkzeuge

Zur einwandreien Einstellung der Geräte sind die folgenden Lehren und Werkzeuge unbedingt erforderlich.

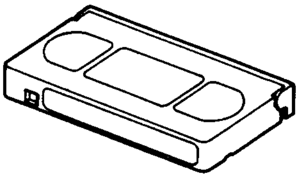
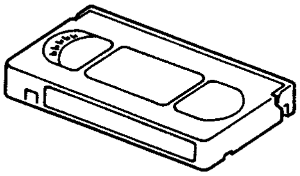
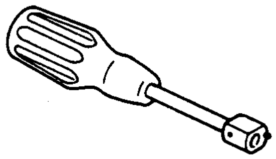
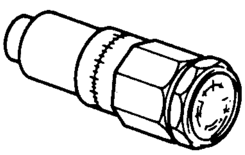
Mechanical Adjustment

1.1 Before Proceeding

Mechanism adjustments are required after replacing mechanical parts due to wear or defect. Since the mechanical and electrical systems are interrelated, correct mechanism adjustment forms the reference for electrical adjustments.
In order to operate the mechanism with the cassette housing removed, place a sheet of insulating material on the upper right portion of the chassis, then set the cassette housing on top of this. Leave the housing connected to the V/M/S board. Insert a spare cassette and after completion of loading, the desired mode can be selected with the operation buttons.

1.2 Required jigs and tools

For proper mechanical adjustment, the following jigs and tools are strongly recommended.

Abgleichband MH-2/MH-F 2 Alignment Tape 	Bremszug-Meßkassette Back Tension Cassette Gauge 
Konischer Hohlschlüssel Tapered nut driver 	Drehmomentmesser mit Adapter Torque Gauge Ass'y 

1.3 Ausbau

1. Gehäuseoberteil und Bodenplatte

* Gehäuseoberteil

1) Vier Schrauben entfernen und Gehäuseoberteil in Pfeilrichtung abnehmen.

* Bodenplatte

1) Nach Abnahme des Gehäuseoberteiles die vier Schrauben lösen und Bodenplatte abnehmen.

1.3 Disassembly

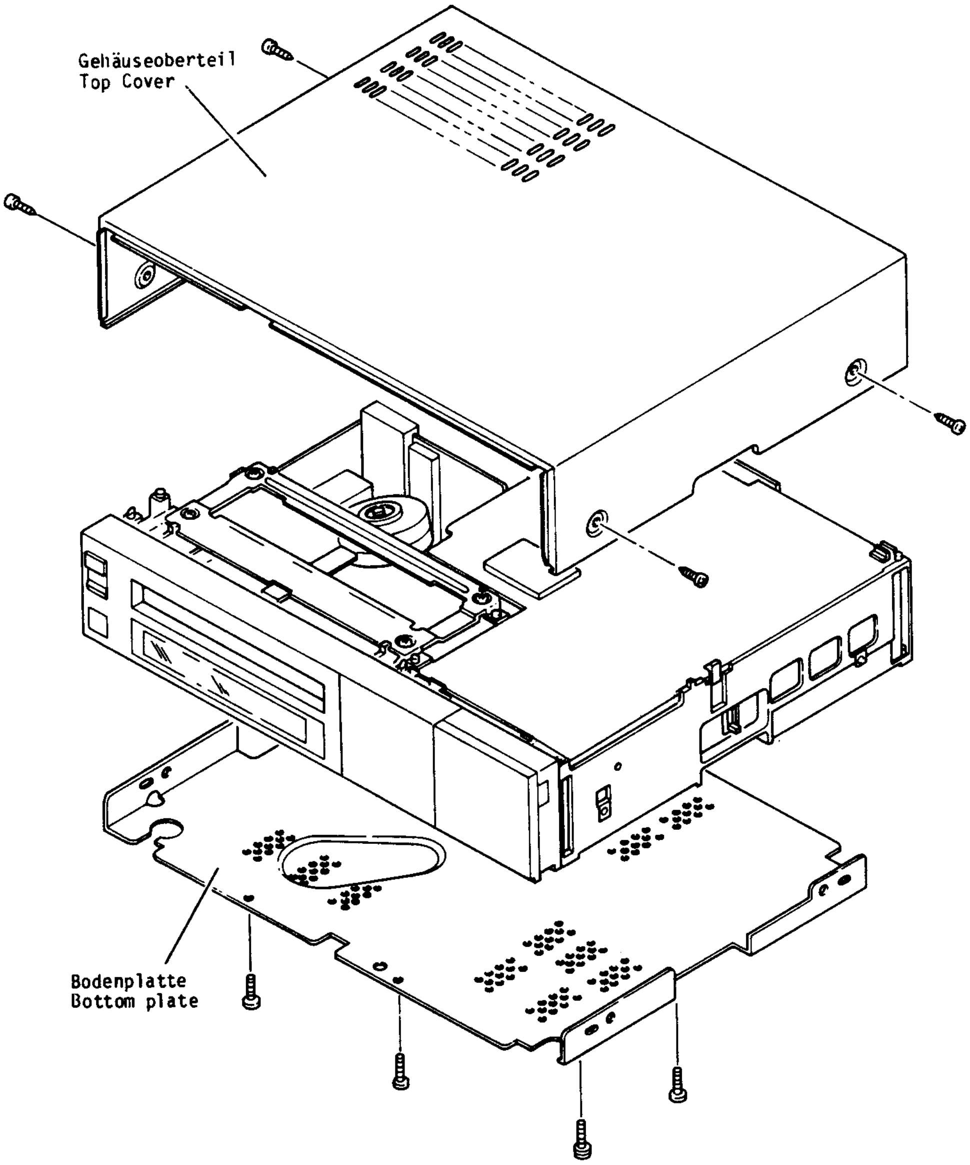
1. Top cover and bottom plate

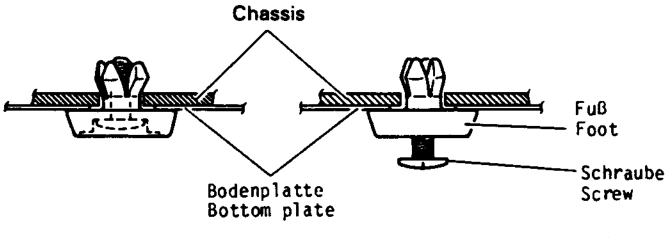
* Top cover

1) Take out four screws, then remove the top cover in the arrow direction.

* Bottom cover

1) After removing the top cover, take out four screws, then remove the bottom cover.


Gehäuseoberteil
Top Cover
Bodenplatte
Bottom plate


Chassis
Fuß
Foot
Schraube
Screw
Bodenplatte
Bottom plate

Fuß an der Platte befestigt
Foot is secured to chassis

Fuß kann herausgenommen werden
Foot can be removed

Abb./Fig. 1-3-1 Gehäuseoberteil und Bodenplatte
Top cover and bottom plate

2. Frontplatte und Cassettenschachtklappen

* Frontplatte

1) Nach dem Ausbau des Gehäuseoberteiles, die drei Snapnasen nach oben drücken und Frontplatte nach vorne klappen.
2) Die Laschen B anheben und Frontplatte nach vorne abziehen.

* Cassettenschachtklappen

1) Die untere Klappe voll nach rechts drücken und das linke Ende aus dem Cassettenschacht ziehen. Auf die Feder achten!
2) Bei der oberen Klappe genauso verfahren.

Hinweis: Beim Einbau darauf achten.
1) Markierung an der oberen Cassettenschachtklappe suchen.
2) Den längeren Teil der Feder hinter die Klappe setzen.
3) Die Markierung der Klappe muß der Markierung am Klappenöffner gegenüber stehen.
4) Der Einbau der unteren Klappe erfolgt auf dieselbe Art und Weise.

2. Front panel and cassette doors

* Front panel

1) After removing the top cover, bend three points A of the front panel upwards to disengage them from the chassis, then pull the front panel outwards.
2) Disengage three points B of the front panel from the chassis for removing the front panel

* Cassette housing doors

1) Move the lower door fully to the right, then disengage the left end of the lower door from the cassette housing. Use care regarding the torsion spring.
2) Remove the upper door in the same manner as the lower door.

Notes: When reassembling the doors, proceed as follows.
1) Locate the mark on the gear portion of the upper door.
2) Set the long straight part of the torsion spring toward the upper door.
3) Install the upper door so, that the mark is aligned with the mark on the upper door opener of the cassette housing.
4) Install the lower door in the same manner as the upper door.

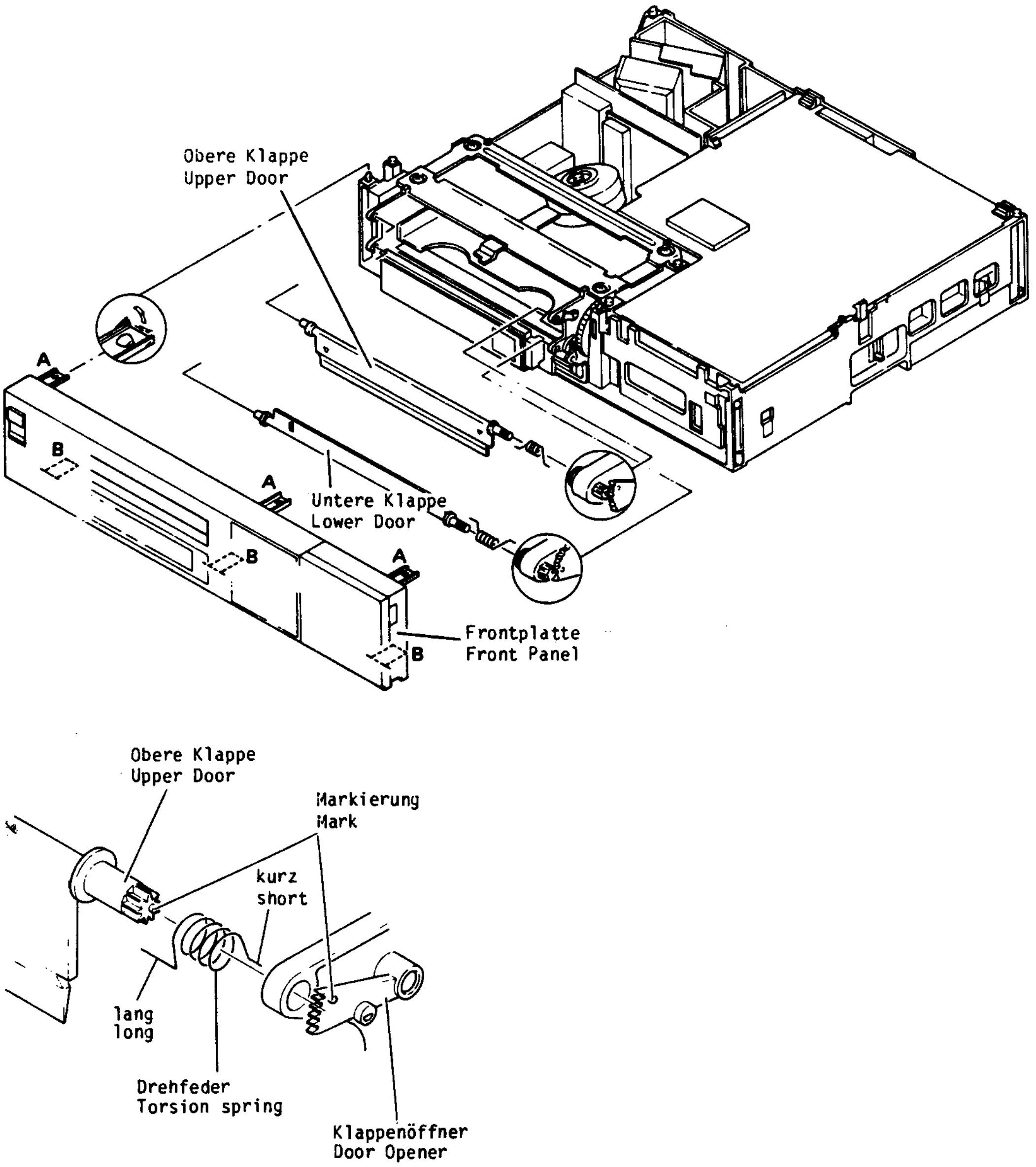
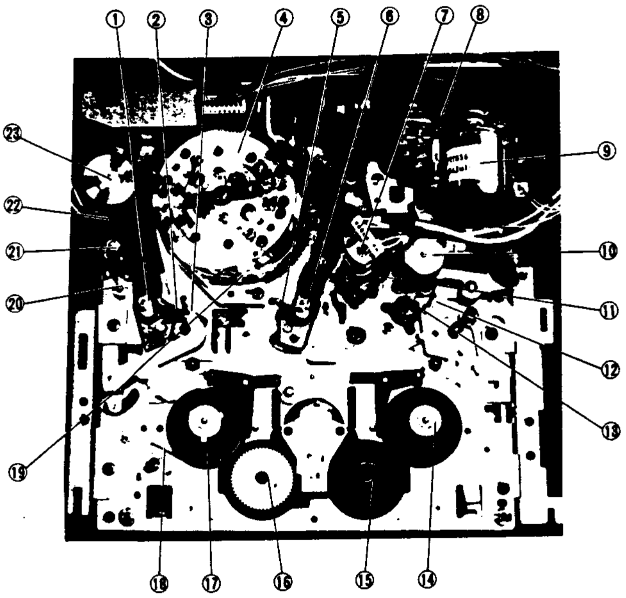
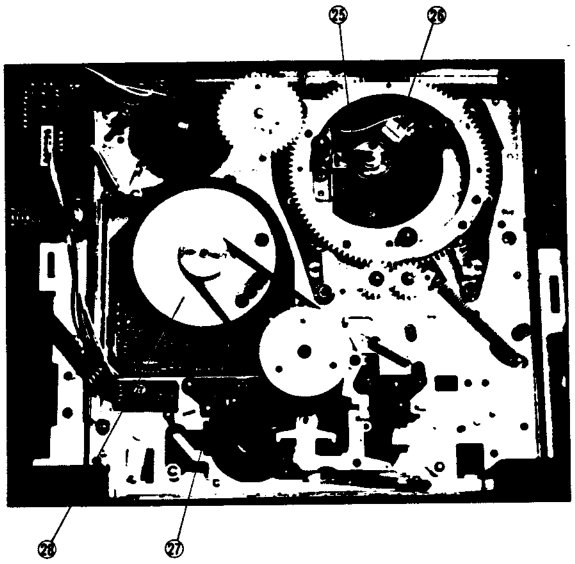

Obere Klappe
Upper Door
A
B
A
B
Untere Klappe
Lower Door
A
B
Frontplatte
Front Panel
Obere Klappe
Upper Door
Markierung
Mark
kurz
short
lang
long
Drehfeder
Torsion spring
Klappenöffner
Door Opener

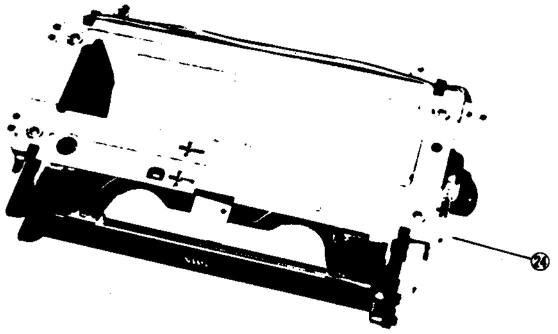
Abb./Fig.1-3-2 Frontplatte und Cassettenschachtklappen
Front panel and cassette housing doors

1.4 Lage wichtiger mechanischer Teile

1.4 Layout of maintenance parts







1	Abwickelführungsrolle SUP guide roller
2	Abwickelumlenkbolzen SUP slant pole
3	Bandzugfühlstift Tension pole
4	Kopftrommel Upper Drum
5	Aufwickelumlenkbolzen T. U. slant pole
6	Aufwickelführungsrolle T. U. guide roller
7	Audio/Synchronkopf A/CTL Head
8	Einfädelriemen Motor control belt
9	Betriebsart-Steuermotor Mode control motor
10	Andruckrolle Pinch roller
11	Aufwickel-Führungsstift T. U. guide pole
12	Führungsarm Guide arm
13	Capstan
14	Aufwickelteller T. U. reel disk
15	Aufwickel-Kupplung T. U. clutch
16	Abwickel-Kupplung SUP clutch
17	Abwickelteller SUP reel disk
18	Bremsband Tension band
19	Kopftrommel-Motor Head drum motor
20	Fühlstift SUP guide pin
21	Abwickelführungsstift SUP guide pole
22	Gesamtlösch-Kopf Full erase head
23	Spannrolle Impedance roller
24	Cassettenschacht-Motor Cassette housing motor
25	Schleifkontakt Brush
26	Impulsaufnahme-Kopf Pick-up head
27	Riemen Reel belt
28	Capstan-Motor Capstan motor

1.5 Auswechseln der wichtigsten Baugruppen

1.5.1 Kopftrommel

1. Die Anschlußdrähte an den Lötstützpunkten der Kopftrommel ablöten.
2. Schraube (1) herausdrehen und Kopftrommel nach oben abziehen.
3. Die Bandlauffläche der neuen Kopftrommel und des Motors vorsichtig mit Alkohol säubern. Darauf achten, daß die Kopfspitzen nicht berührt werden und die Kopftrommel nicht zerkratzt wird.
4. Beim Einbau der Kopftrommel in umgekehrter Reihenfolge zum Ausbau verfahren. Beim Anlöten der Drähte darauf achten, daß die Drähte nicht vertauscht werden. Die Lötwärme möglichst gering halten.

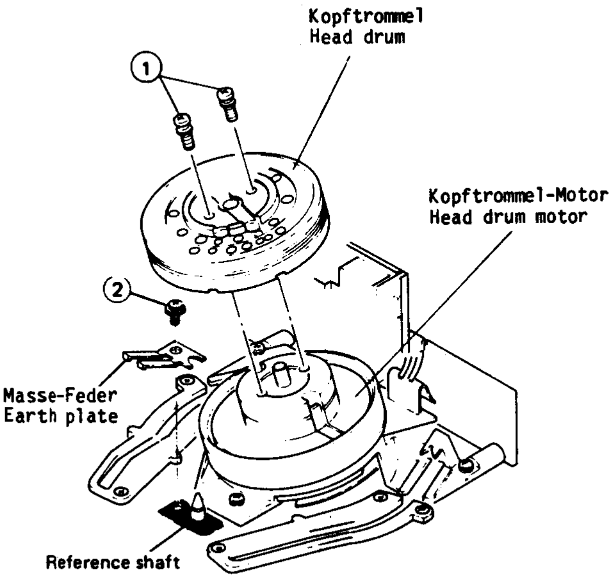


Abb./Fig. 1-5-1 Austausch der Kopftrommel
Upper drum replacement

Farbe der Löt-Pins	Kanal	Innere/äußere Drahtfarbe
Braun	SP, CH-1	Grün/Braun
Rot	SP, CH-2	Rot/Weiß (farblos)
Blau	LP, CH-1	Schwarz/Blau
Orange	LP, CH-2	Gelb/Orange
Grau	A-1	Hellgrün/Violett
Grau	A-2	Grau/Weiß oder Rosa/Weiß

1.5.2 Audio/Synchronkopf

1. Stecker CN 1 und CN 2 von der Audio/Synchronkopf-Platte abziehen.
2. Schrauben (1) herausdrehen und Audio/Synchronkopf mit der Grundplatte abnehmen.
3. Die Anschlußdrähte ablöten und Anschlußplatte herausziehen.
4. Schraube (2) lösen und Abschirmkappe abnehmen.
5. Schrauben (3) herausdrehen und den Audio/Synchronkopf von der Grundplatte lösen. Auf die Federn achten!
6. Der Einbau erfolgt in umgekehrter Reihenfolge zum Ausbau. Vor dem Einbau in das Hauptchassis sollte die Grobeinstellung ausgeführt werden (siehe Abb. 1-5-2 a).
7. Bandtransportsystem und Austauschbarkeitsprüfungen vornehmen.

1.5 Main assembly replacement

1.5.1 Upper drum

1. Unsolder the wires connecting the lower drum from the relay pins of the upper drum.
2. Take out screws (1) and remove the upper drum in the upward direction.
3. Use alcohol to clear the lower face of the new upper drum and the upper face of the lower drum. When handling and installing the new upper drum, avoid directly touching the head tips and use care not to scratch the drum.
4. Reassemble by reversing the above steps. When resoldering, observe the correct channels and avoid overheating the wires.

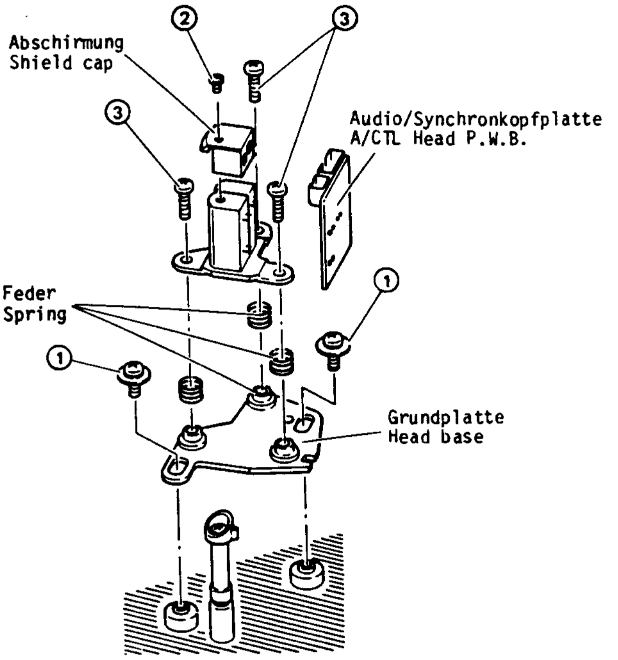


Abb./Fig.1-5-2 Austausch des Audio/Synchronkopfes
Replacement of A/CTL head

Relay Pin Color	Channel	Inner/Outer wire Color
Brown	SP, CH-1	Brown/Green
Red	SP, CH-2	Red/White (clear)
Blue	LP, CH-1	Blue/Black
Orange	LP, CH-2	Orange/Yellow
Gray	A-1	Violet/Light green
Gray	A-2	Gray or Pink/White

1.5.2 Audio/Control head

1. Disconnect connectors CN 1 and CN 2 from A/CTL Head board.
2. Take out screws (1) and remove the audio/control head with the head base.
3. Unsolder the terminals coming from the heads and remove the A/CTL Head PWB.
4. Take out screws (2) and remove the shield cap from the audio/control head.
5. Take out screws (3) to separate the audio/control head from the head base. Use care regarding springs.
6. Replace the audio/control head and reassemble by reversing the above steps. Before mounting on the main-deck, perform rough-adjustment of audio/control head height.
7. Perform the tape transport/interchangeability checks and adjustments.

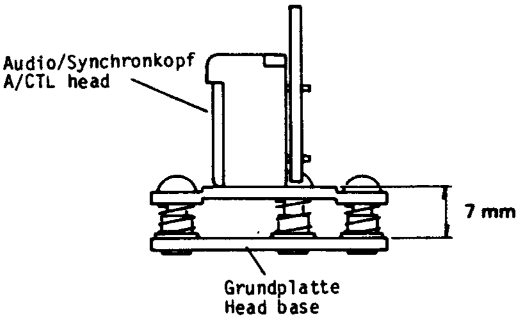

Audio/Synchronkopf
A/CTL head
7 mm
Grundplatte
Head base

Abb./Fig.1-5-2a Audio/Synchronkopf Höhe
A/CTL head height

1.5.3 Wickelteller

1. Nach dem Austausch der Wickelteller muß der Bandzug überprüft werden.

1.5.4 Kupplungs-Mechanik

1. Nach dem Austausch von Kupplungsteilen sollte das Drehmoment überprüft werden.

1.5.5 Bremsband

1. Nach dem Austausch des Bremsbandes, Bandzugfühler und Bandzug einstellen.

1.6 Prüfarbeiten und Einstellungen

1.6.1 Mechanik-Ablaufsteuerung

* Einfädelkränze und Antriebsrad

1. Die zwei Löcher im Abwickel- und Aufwickelzahnkranz müssen genau über dem Loch im Hauptchassis stehen (Pfeil A in der Abb. 1-6-1). Ist dies nicht der Fall, Zwischenzahnrad (2) entfernen und Abwickel-und Aufwickelzahnrad entsprechend ausrichten.
2. Ebenso ist darauf zu achten, daß die Pfeilmarkierung am Zwischenzahnrad (2) dem Loch B des Abwickelzahnkranzes gegenüber steht. Bei einer eventuellen Abweichung, Zwischenzahnrad (2) ausbauen und so wieder einbauen, daß die Pfeilmarkierung dem Loch B gegenüber liegt

* Nockenwellenrad/Zwischenzahnrad (1)

1. Wenn die beiden Löcher im Nockenwellen-und Zwischenzahnrad genau über dem Loch C liegen, überprüfen ob die Pfeilmarkierung am Zwischenzahnrad der V-Aussparung im Hauptchassis gegenüber liegt. Bei eventuellen Abweichungen, Zwischenzahnrad (1) ausbauen und so wieder einbauen, daß die Pfeilmarkierung der V-Aussparung gegenüber liegt.

1.5.3 Reel disk

1. After replacing the reel disk, perform back tension checks.

1.5.4 Clutch Mechanism

1. After replacing the take-up/supply clutch and/or clutch mechanism, perform take-up torque check.

1.5.5 Tension band

1. After replacing the tension band, perform tension pole position check and adjustment. Perform back tension checks.

1.6 Checks and Adjustments

1.6.1 Mechanism timing check

* Loading rings and loading gear (2)

1. Confirm that the two holes of supply and take-up loading rings are aligned with the hole of the main-deck (arrow in fig. A). If a discrepancy is noted, after removing the loading gear (2), adjust the loading rings to obtain correct position.
2. At the same time, confirm that the arrow mark of the loading gear (2) corresponds with hole B of the supply loading ring. If a discrepancy is noted, remove and reinstall the loading gear (2) to obtain the correct position.

* Cam gear and loading gear (1)

1. When the two holes of the cam gear and drive gear bracket are aligned with hole C of the main-deck, confirm that the arrow mark of loading gear (1) is aligned with the V-cutout portion of the main-deck. If a discrepancy is noted, remove and reinstall the loading gear (1) to obtain the correct position.

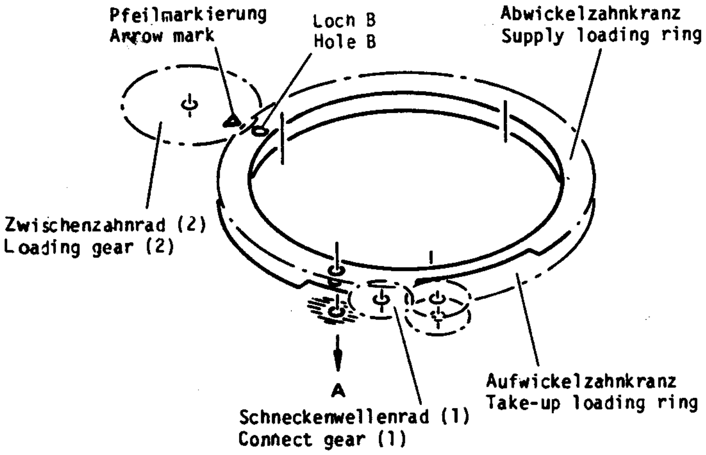

Pfeilmarkierung
Arrow mark
Loch B
Hole B
Abwickelzahnkranz
Supply loading ring
Zwischenzahnrad (2)
Loading gear (2)
A
Schneckenwellenrad (1)
Connect gear (1)
Aufwickelzahnkranz
Take-up loading ring

Abb./Fig. 1-6-1 Einfädelkränze/Zwischenzahnrad (2)
Loading rings/Loading gear (2)

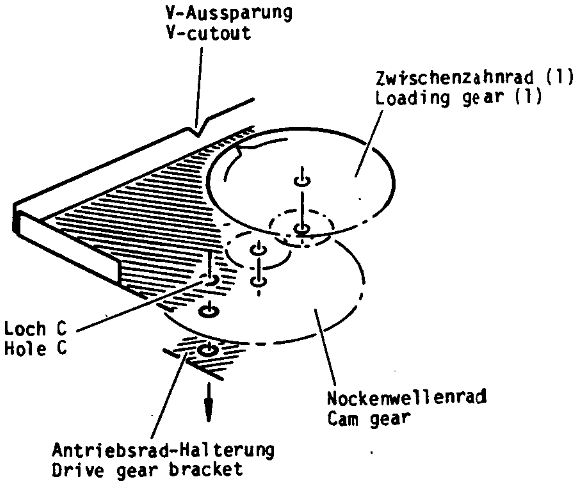

V-Aussparung
V-cutout
Zwischenzahnrad (1)
Loading gear (1)
Loch C
Hole C
Nockenwellenrad
Cam gear
Antriebsrad-Halterung
Drive gear bracket

Abb./Fig. 1-6-2 Nockenwellenrad/Zwischenzahnrad (1)
Cam gear/loading gear (1)

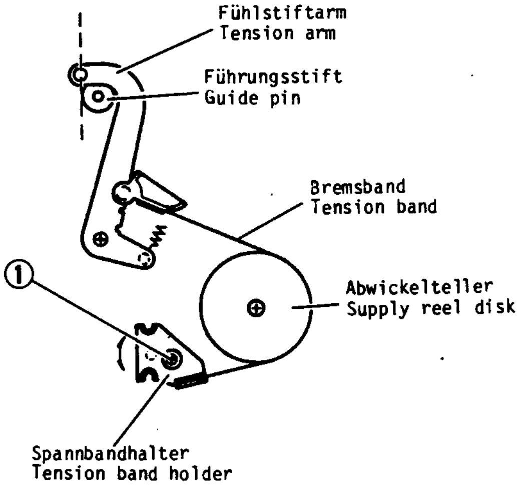


Abb./Fig. 1-6-3 Lageeinstellung des Bandzug-Fühlstifts
Tension pole position

1.6.2 Lageüberprüfung des Bandzug-Fühlstiftes

1. Ohne eingebauten Cassettenschacht auf Wiedergabe stellen.
2. Wie aus Abb. 1-6-3 hervorgeht, muß die Mitte des Bandzug-Fühlstifts in gerader Linie zur linken Sockelkante des Führungsstiftes liegen.
3. Falls erforderlich, Schraube (1) lösen und Spannband-Halterung auf korrekte Lage des Bandzug-Fühlstiftes neu justieren.

1.6.3 Überprüfung des Drehmoments

1. Recorder in SP-Wiedergabe schalten.
2. Drehmomentmesscassette einlegen.
3. Der angezeigte Wert muß zwischen 60-100 g/cm liegen

1.6.4 Bandzug-Einstellung

1. Lageeinstellung des Bandzug-Fühlstiftes überprüfen.
2. Bandzugmesscassette einlegen und Recorder in SP-Wiedergabe stellen.
3. Die Anzeige muß zwischen 11 und 18 g/cm liegen. Liegt die Anzeige nicht innerhalb dieser Grenzen, Lage des Bandzugfühlstiftes und Zustand der Feder zwischen Bandzugarm und dem Hauptchassis überprüfen. Falls notwendig, Bremsband austauschen.

1.7 Tests und Einstellungen am Bandlauf-System

Das Bandlaufsystem ist werkseitig auf das Genaueste abgeglichen und ein Nachstellen ist demzufolge normalerweise nicht erforderlich. Nachfolgende Überprüfungsarbeiten sind daher nur bei besonders hoher Beanspruchung oder nach Austausch bandführender oder dem Bandlauf-System zugehöriger Teile erforderlich.

1.6.2 Tension pole position ckeck

1. With the cassette housing removed, set for the play mode.
2. As shown in Fig. 1-6-3, confirm that the center of the tension pole is aligned with the left edge of the supply guide pin bushing.
3. If required, loosen screw (1) and adjust the mounting position of the tension band holder.

1.6.3 Take-up torque check

1. With the cassette housing removed, set for the Play (SP) mode.
2. Insert cassette torque meter.
3. Confirm a value between 60 and 100 g/cm

1.6.4 Back tension ckeck

1. First confirm correct tension pole position.
2. Use the back tension cassette gauge and set for the Play (SP) mode.
3. Confirm a value between 11 and 18 g/cm. If outside this range, check the tension arm spring and if necessary, replace the tension band. In some cases, the supply reel disk may need replacement.

1.7 Tape Transport System Checks and Adjustments

The tape transport system has been precisely aligned at the factory and normally does not require readjustment. The following ckeck is therefore necessary only in cases of severe usage or when replacing parts affecting the tape transport system.

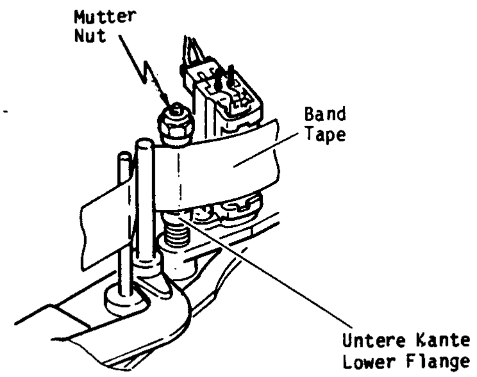


Abb./Fig. 1-7-2 Führungsrolle-Höheneinstellung
Height of supply guide pole

1.7.1 Führungsrolle-Höheneinstellung

1. Stellschraube am Sockel der Führungsrolle lockern.
2. Cassette einlegen und Gerät auf Wiedergabe schalten.
3. Schraubenzieher in den Kopf der Führungsrolle stecken und langsam und vorsichtig drehen, bis das Band satt und ohne auf und ab in der Führungsrolle läuft.

Hinweis: Stellschraube nur soweit lockern, daß die Führungsrolle gedreht werden kann. Bei zu loser Stellschraube kann die Führungsrolle durch den Bandlauf versehentlich verstellt werden. Führungsrolle vorsichtig drehen, um eine Beschädigung des Bandes zu vermeiden.

1.7.2 Abwickel-Bandführungsbolzen

1. Cassette einlegen und Gerät auf Wiedergabe schalten.
2. Mutter mit einem metrischen Schraubenschlüssel so drehen, daß die untere Kante des Bandes nicht aufsteht, sondern glatt verläuft

1.7.3 Audio/Synchronkopf-Neigung

1. Nach dem Einstellen der Abwickel-Führungsrolle den Bandlauf an der Fläche des Aufwickel-Bandführungsbolzens überprüfen. Kreuzschlitzschraubendreher in Schraube (2) einsetzen und gegen den Uhrzeigersinn verstellen, bis sich Bandschlaufen bilden.
2. Dann Schraube vorsichtig nach rechts drehen, bis die Bandschlaufen gerade verschwinden.
3. Azimuth und Höhen-Einstellung des Audio/Sync. Kopfes werden im nachfolgen Teil 1.8 beschrieben.

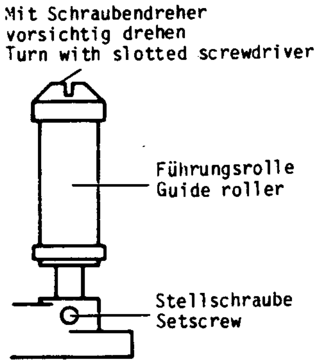


Abb./Fig. 1-7-1 Führungsrolle-Höheneinstellung
Guide roller height adjustment

1.7.1 Guide roller height adjustment

1. Slightly loosen the setscrew under the guide roller of the pole base.
2. Use a cassette tape and set for the play mode.
3. With a slotted screwdriver, slightly turn the guide roller so that the tape travels smoothly in the drum lead without slipping upwards or downwards.

Note: Loosen the setsrew only enough to allow the guide roller to be turned. If excessively loose, tape motion may turn the roller inadvertently. Turn the roller carefully to avoid damage to the tape.

1.7.2 Supply guide pole

1. Use a cassette tape and set for Play mode.
2. Turn the upper nut to obtain smooth tape transport at the lower flange of the guide pole.

1.7.3 Audio/Control head inclination

1. After adjusting the take-up guide roller, observe the tape transport at the lower flange of the take-up guide pole. Use a cross-head screwdriver and turn screw (2) counter-clockwise to where wrinkles begin to appear in the tape at the lower flange.
2. Then gradually turn the screw clockwise to the point where the wrinkles no longer appear.
3. Azimuth and height of the audio/control head are adjusted during interchangeability adjustments.

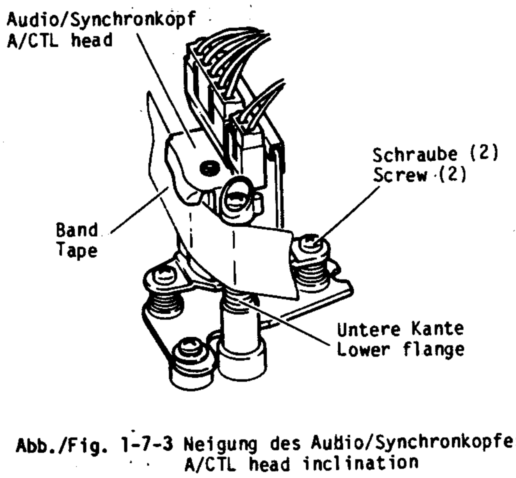


Abb./Fig. 1-7-3 Neigung des Audio/Synchronkopfes
A/CTL head inclination

1.8 Band-Austauschbarkeitsprüfung und Einstellung

Vor dem Einlegen der Test/Abgleichcassette normale Cassette einlegen und Bandlauf auf einwandfreies Funktionieren überprüfen.

1. Oszilloskop an TP 6 der [3] [5] Vorverstärker-Platte anschließen und mit TP 11 triggern.
2. Test Cassette MH-2 Treppensignal abspielen.
3. Spurlagenregler TRACKING auf max. FM-Ausgang einstellen. FM-Kurvenform am Schirm beobachten und max. Pegel (a) und die min. Pegel (b), (c) und (d) notieren. Die Verhältnisse zwischen den Pegeln müssen wie folgt aussehen:

$$\frac{b}{a} \geq 0{,}7 \quad \frac{c}{a} \geq 0{,}5 \quad \frac{d}{a} \geq 0{,}5$$

4. Werden Abweichungen festgestellt, sind folgende Einstellungen notwendig.
5. Oszilloskop-Bildschirm beobachten und mit dem Trackingregler das FM-Packet von Max. zu Min. verändern.
6. Das FM-Paket muß sich am Bandeinlauf parrallel verändern. Ist dies nicht der Fall, muß die Abwickelführungsrolle durch leichtes Verdrehen so lange verstellt werden, bis die Vorderflanke des FM-Paketes nahezu flach wird.
7. Das Gleiche gilt auch für den Bandauslauf. Hierbei muß die Abwickelführungsrolle durch leichtes Drehen so verstellt werden, bis die Rückflanke des FM-Paketes nahezu eine flache Form aufweist.
8. Bei dieser Einstellung dürfen keine Bandschlaufen, weder Auf -noch Ablaufen des Bandes an der Kopftrommel vorhanden sein. Ist dies der Fall müssen die vorhergenannten mech. Einstellarbeiten an der entsprechenden Stelle ausgeführt werden.

1.8 Interchangeability checks and adjustment

Before using Alignment tape, use a spare cassette and confirm proper tape transport without damage to the tape.

1. Connect an oscilloscope to TP 6 of the [3] [5] Pre amp board. Trigger externally with the signal from TP 11 of the [3] [5] Pre amp board.
2. Play the alignment tape (stairstep signal) MH-2.
3. Turn the TRACKING knob to obtain the maximum FM output.
   Observe the FM waveform, read the maximum level (a) and the minimum levels (b), (c) and (d). Confirm that:

$$\frac{b}{a} \geq 0.7 \quad \frac{c}{a} \geq 0.5 \quad \frac{d}{a} \geq 0.5$$

4. If deviations are noted, the following adjustments are necessary.
5. Observe the screen of the oscilloscope and change the FM package level from maximum to minimum by rotating the tracking control.
6. The FM package must change parallel at the tape in point. If this is not so, the position of the supply reel guide pin must be changed by turning it slightly, until the rising flank of the FM package becomes nearly flat.
7. Above applies also to the tape out point. If necessary, change the position of the supply reel by turning it until the rear flank of the FM package becomes nearly flat.
8. Prerequisite for this adjustment is that there are no tape loops, and the tape must run smoothly either up or down. If any of these problems are noted, the relevant mechanical adjustments must be performed by referring to the appropriate paragraph of the instructions for mechanical adjustments.

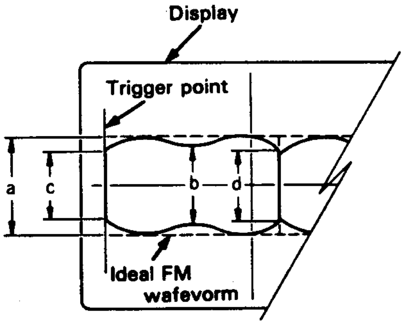


Abb./Fig. 1-8-1 FM-Paket Einstellung
FM waveform adjustment

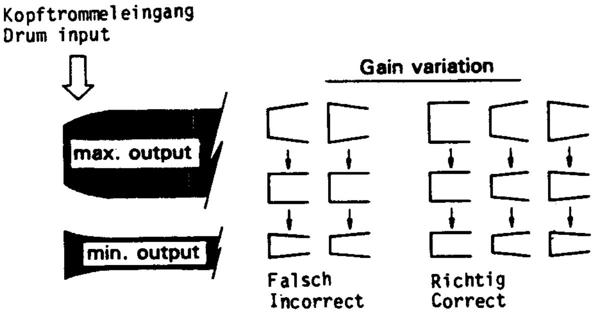


Abb./Fig. 1-8-2 Kopftrommeleingang
Drum input

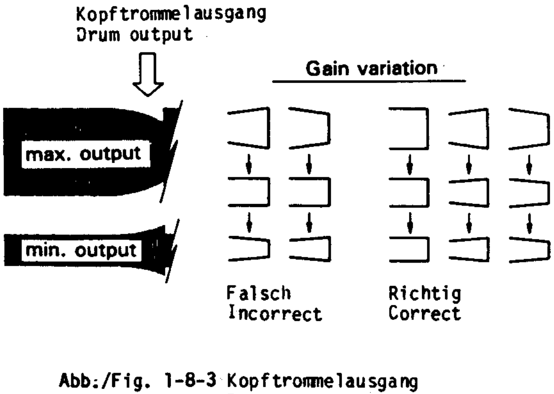


Abb:/Fig. 1-8-3 Kopftrommelausgang
Drum output

1.8.2 Audio/Synchronkopf-Höhe und Azimuth Einstellung

1. Oszilloskop an den Audio-Ausgang der Scart-Buchse anschließen, oder Kopfhörer anschließen.
2. Den 6 kHz-Teil der Audio-Cassette abspielen.
3. Den Azimuth durch Verstellen der Schraube (3) auf max. Audio-Ausgangspegel einstellen.
4. Um die Audio/Synchronkopfhöhe einzustellen, müssen die Schrauben (1), (2) und (3) nacheinander und in kleinen Schritten verstellt werden.Dabei muß immer der Audio-Pegel auf Max. gehalten werden. Das Band darf an dem Aufwickel-Bandführungsbolzen keine Schlaufen bilden oder an der Kante aufstehen.

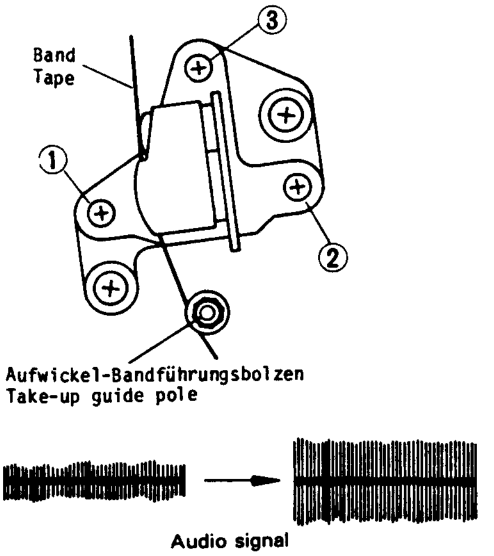


Abb./Fig. 1-8-4 Audio/Synchronkopfhöhe
A/CTL head height

1.8.3 Audio/Synchronkopf-Phase

1. Oszilloskop an TP 6 der [3] [5] Vorverstärker-Platte anschließen und mit TP 11 triggern.
2. Test Cassette MH-2 Treppensignal abspielen. Tracking-Regler auf Mitte stellen.
3. Schrauben (4) und (5) ein wenig lösen und über der Schraube (4) und dem daneben liegendem Loch das Abgleichwerkzeug aufsetzen.
4. Mit dem Abgleichdreher entgegen dem Uhrzeigersinn drehen, so daß sich der Audio/Synchronkopf in Richtung Capstan bewegt. Danach langsam den Kopf wieder zurückstellen, bis das erste FM-Pegel Maximum erreicht ist. Schrauben wieder anziehen.
5. Den Trackingregler verstellen und prüfen ob das FM-Max. bei Trackingregler-Mittelstellung erreicht wird.

1.8.4 Abschließende Tests

1. Eigenaufnahme wiedergeben. Die FM-Hüllkurve sollte die Spezifikationen der MH-2 Testcassette erfüllen.
2. Für Hifi-Recorder. Oszilloskop an die Hifi Ausgänge anschließen und MH-F2 Abgleichband abspielen. In dem Audio-FM Paket sollten keine Einbrüche vorhanden sein.
3. Den elektrischen Abgleich betrachten und den Servo, Video und Audio-Abgleich durchführen.

1.8.2 A/CTL head height and azimuth adjustments

1. Connect oscilloscope to Audio-Out of Scart socket, or connect headphones and directly listen to the sound that forms a useful test.
2. Play the stairstep (audio 6 kHz) section of the MH-2 alignment tape.
3. Adjust the azimuth by turning screw (3) for maximum audio output.
4. Adjust the height by turning screws (1), (2) and (3) by small and equal increments at a time for maximum audio output so that small tape wrinkles are not produced at the take-up guide pole.

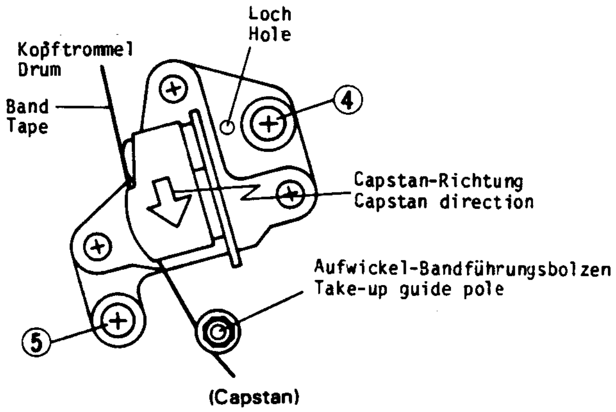


Abb./Fig. 1-8-6 Audio/Synchronkopf Phase
A/CTL head phase

1.8.3 Audio/Control head phase

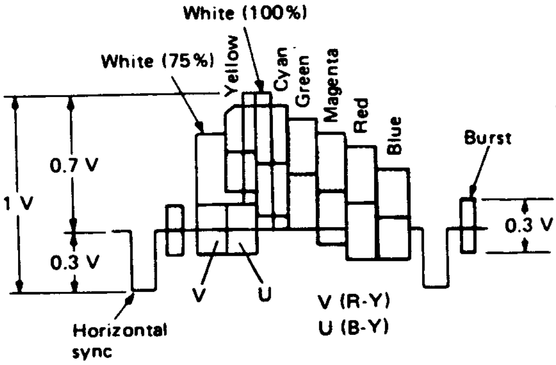
1. Connect an oscilloscope to TP 6 of the [3] [5] Pre amp board. Trigger externally with the signal from TP 11 of the [3] [5] Pre amp board.
2. Play the stairstep section of the MH-2 Alignment tape.
3. Slightly loosen screws (4) and (5) of the audio/control head. Place the A/CTL head positioning tool over screw (4) with the pin of the tool inserted in the adjustment hole near the screw.
4. Turn the tool counter-clockwise to position the audio/control head fully toward the capstan side while observing the waveform. At the first output peak, stop turning and immediatly tighten the screws.
5. Operate the tracking control and confirm that maximum FM waveform is obtained at the center click position.

1.8.4 Final checks

1. Supply a video or TV signal input, record and playback. Confirm that the FM waveform conforms to the video FM waveform specifications of the MH-2 alignment cassette.
2. For Hifi models, connect an oscilloscope to the audio FM output. Play the FM audio signal of the MH-F2 alignment tape. Confirm absence of serious dips in the FM waveforms.
3. Refer to Electrical Adjustments and perform overall checks and adjustments of the servo, video and audio circuits.

Kurzverzeichnis-Schlüssel
Key to abbreviation

V/A/F	Video/Audio/FM Audio [0] [2]
SP	Standard/Normal-Wiedergabe
SP	Standard Play
LP	Doppelte Aufnahme/Wiedergabezeit
LP	Long Play
REC→PB	Eigenaufnahme wiedergeben
REC→PB	Record than playback



2. Elektrische Einstellung

Erforderliche Meß-und Abgleichmittel

1. Farbfernsehgerät oder Monitor
2. Zweistrahloszilloskop, Bandbreite 10 MHz
3. Tongenerator
4. NF-Millivoltmeter
5. Digitalvoltmeter
6. Farbbalkengenerator
7. Abgleichband MH-2
8. Frequenzzähler

2. Electrical adjustments

Required test equipment and jigs

1. Color television or monitor
2. Oscilloscope, wide-band, dual trace, triggered delayed-sweep
3. Audio signal generator
4. Audio meter
5. Digital voltmeter
6. Signal generator: PAL color bar, stairstep
7. Alignment tape MH-2
8. Frequency counter

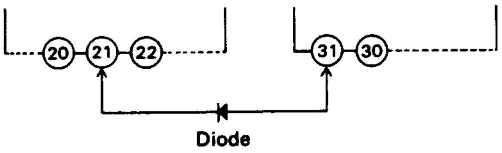
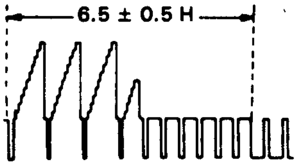
Da das HF-Eingangs-Signal zum Abgleich genommen wird, sind die Spezifikationen des ZF-Ausgangs-Signals wie die Abb. zeigt zu beachten. An den Antenneneingang einen Farbbalkengenerator anschließen. Oszilloskop an den VIDEO OUT-Ausgang der Video-Platte anschließen und das Signal überprüfen.

Amplitude des Synchronsignals	ca. 0,3 V_{ss}
Amplitude des Videosignals	ca. 0,7 V_{ss}
Amplitude des Farbburstsignals	ca. 0,3 V_{ss}

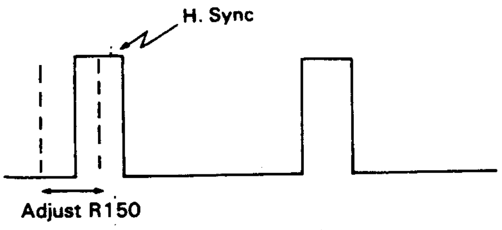
Because the RF signal is used for adjustment of circuits, it is important that the video output signal of the IF circuit satisfy the items shown in figure. Connect the colour bar signal generator to the ANT IN terminal. Connect the oscilloscope to the VIDEO OUTPUT terminal of the video circuit, and check the video output signal.

Amplitude of sync signal approx.:	0.3 V_{p-p}
Amplitude of video signal approx.:	0.7 V_{p-p}
Amplitude of colour burst signal:	0.3 V_{p-p}

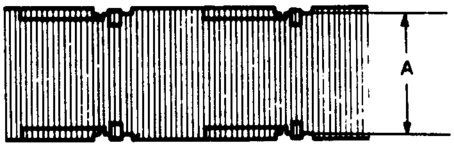
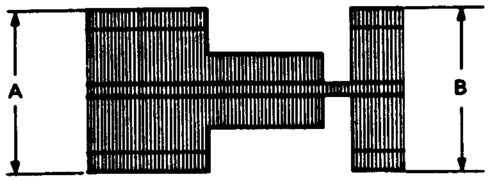
Einstellung Adjustment		Betriebsart Mode	Meßpunkt Test point	Einstellpunkt Adjuster control	Einstellschritte Remarks
[0] [1] Netzteil **Power Regulator**					
1.	DC 9 V	REC	Stecker CN 2 Stift 3	R 21	1) Mit R 21 auf 9,30 ± 0,1 V an Stecker CN 2 Stift 3 einstellen.
1.	DC 9 V	REC	CN 2 pin 3	R 21	1) Adjust R 21 for 9.30 ± 0.1 V at CN 2 pin 3.
2.	DC 5 V	REC	Stecker CN 2 Stift 4	R 15	1) Mit R 15 auf 5,31 ± 0,1 V an Stecker CN 2 Stift 4 einstellen.
2.	DC 5 V	REC	CN 2 pin 4	R 15	1) Adjust R 15 for 5.31 ± 0.1 V at CN 2 pin 4.

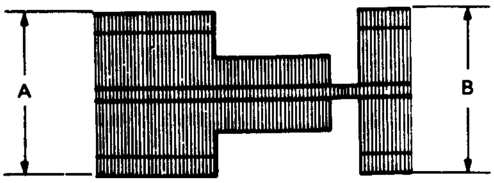
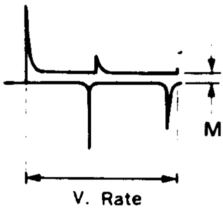
Einstellung Adjustment	Betriebsart Mode	Meßpunkt Test point	Einstellpunkt Adjuster control	Einstellschritte Remarks
[0] [3] Timer				
1. Taktfrequenz	EE-Betrieb	TP 2	C 102	1) Frequenzzähler an TP 2 anschließen. 2) Über eine Diode Pin 31 IC 101 und Pin 21 IC 102 kurzzeitig verbinden. 3) TP 5 nach Masse legen. 4) Mit C 102 auf f=2048,01 ± 2 Hz einstellen.
1. Timer Clock  	E-E mode	TP 2	C 102	1) Connect a frequency counter to TP 2. 2) Briefly short pin 31 of IC 101 and pin 21 of IC 102 with a diode. 3) Connect a jumper wire between TP 5 and GND. 4) Adjust C 102 to obtain f=2048.01 ± 0.002 Hz
2. Einblend-Takt frequenz	EE-Betrieb	TP 1	R 10	1) Frequenzzähler an TP 1 anschließen. 2) TP 7 und 4 nach Masse kurzschließen. 3) Mit R 10 die Frequenz auf 6,30 ± 0,05 MHz einstellen.
2. ON Screen Clock Adj.	E-E mode	TP 1	R 10	1) Connect a frequency counter to TP 1. 2) Short TP 7 and TP 4 to GND. 3) Adjust R 10 to obtain frequency 6.30 ± 0.05 MHz.
[0] [3] Servo				
1. PB-Umschalt-zeitpunkt (SP)  	SP (PB) MH-2 Treppe	TP 10 V/A/F-Platte [0] [2]	R 149	1) Oszilloskop an TP 10 der V/A/F-Platte [0] [2] und extern an TP 11 (DRUM FF) der [3] [5] Rec-Vorverstärker-Platte anschließen. Triggerung auf (-). 2) Treppensignal der MH-2 Cassette abspielen und mit R 149 der [0] [2] V/A/F-Platte auf 6,5 ± 0,5 Zeilen vor dem Vertikal-Impuls einstellen.
1. SP PB Switching Point	SP (PB) MH-2 Stairstep	TP 10 V/A/F board [0] [2]	R 149	1) Connect an oscilloscope to TP 10 of the V/A/F board [0] [2] and trigger the oscilloscope externally with the signal from TP 11 (DRUM FF) of the PRE/REC board [3] [5]. Set the trigger slope to (-). 2) Play the stairstep signal of the MH-2 Alignment tape and adjust R 149 of the V/A/F board [0] [2] to position the switching point 6.5 ± 0.5 H from V. Sync.
2. Vertikal-Impuls-Position	REC→PB SP Standbild	Monitor TV	R 423 Gehäuserückwand	1) Eigenaufnahme wiedergeben und in den Standbild-Betrieb gehen. 2) Mit R 423 auf minimales Bildzittern auf dem Monitor einstellen.
2. Vertical Pulse position	REC→PB SP Still	Monitor TV	R 423 Rear panel	1) Record, then playback a color signal. Set to the Still mode. 2) Observe the monitor-TV and adjust R 423 of the rear panel to minimize vertical jitter.

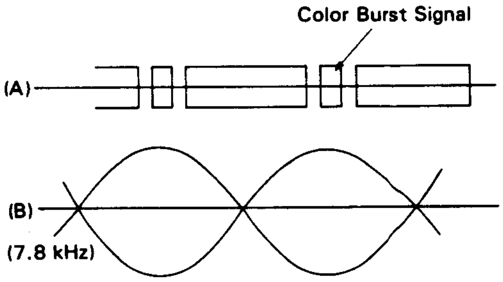
Einstellung Adjustment	Betriebsart Mode	Meßpunkt Test point	Einstellpunkt Adjuster control	Einstellschritte Remarks
3. Horizontal Diskriminator	PB→Standbild	TP 12 V/A/F-Platte	R 150 (H.DISCRI) V/A/F-Platte [0] [2]	1) Oszilloskop an TP 27 der V/A/F-Platte [0] [2] anschließen. 2) Farbbalkensignal der MH-2 Testcassette abspielen und sich auf dem Oszi-Bildschirm die Lage des Impulses notieren. 3) Recorder in den Standbild-Betrieb schalten und mit R 150 auf dieselbe Lage, wie im PB Betrieb, einstellen.
3. H. Discriminator	PB→Still MH-2 Color bar	TP 12 V/A/F board [0] [2]	R 150 (H.DISCRI) [0] [2]	1) Connect an oscilloscope to TP 27 of the V/A/F board [0] [2]. 2) Play the color bar signal of the MH-2 Alignment tape and mark the horizontal sync signal position on the oscilloscope screen. 3) Set for the Still mode and adjust R 150 of the V/A/F board to position the H. sync signal at the marked location.
4. Zeitlupen Spurlage	PB Farbbalken	TV Monitor	R 151, 152, 153 V/A/F-Platte [0] [2]	1) Abwechselnd im SP und LP-Betrieb Farbbalken-Signal aufnehmen. 2) In Zeitlupe/Raffer Vorwärts-Betrieb wiedergeben und mit R 153 für (SP) und R 152 für (LP)-Betrieb auf der V/A/F-Platte [0] [2] auf minimale Streifen einstellen. 3) In Zeitlupe/Raffer Rückwärts-Betrieb wiedergeben und mit R 151 (LP)-Betrieb der V/A/F-Platte [0] [2] auf minimale Streifen einstellen.
4. Slow Tracking	PB Color bar	Monitor TV	R 151, 152, 153 V/A/F board [0] [2]	1) In sequence, record a color bar signal in the SP, then the LP mode. 2) Play back in the FWD slow mode and adjust R 153 (SP) and R 152 (LP) of the V/A/F board [0] [2] to minimize noise. 3) Play back in the REV slow mode and adjust R 151 (LP) of the V/A/F board [0] [2] to minimize noise.

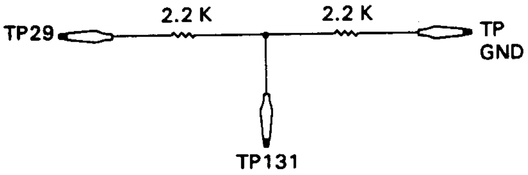
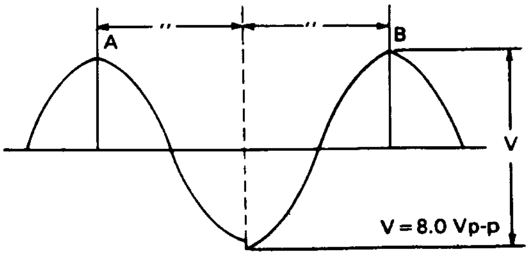


[0] [2] Video

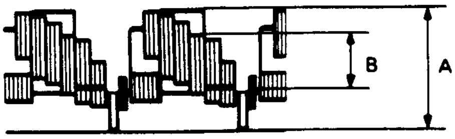
Einstellung Adjustment	Betriebsart Mode	Meßpunkt Test point	Einstellpunkt Adjuster control	Einstellschritte Remarks
1. VXO	PB MH-2 Farbbalken SP	TP 106 V/A/F-Platte [0] [2]	R 179 V/A/F-Platte [0] [2]	1) Frequenzzähler an TP 106 der V/A/F-Platte [0] [2] anschließen. 2) Farbbalkensignal der MH-2 Testcassette abspielen und mit R 179 auf der V/A/F-Platte [0] [2] die Frequenz auf 4,433619 MHz ± 50 Hz einstellen.
1. VXO	PB MH-2 Color bar SP	TP 106 V/A/F board [0] [2]	R 179 V/A/F board [0] [2]	1) Connect a frequency counter to TP 106 of the V/A/F board [0] [2]. 2) Play the color bar signal of the MH-2 Alignment tape and adjust R 179 of the V/A/F board [0] [2] to obtain 4.433619 MHz ± 50 Hz.
2. REC FM-Pegel	REC LP Farbbalken	TP 4 Aufnahme-Vorverstärker-Platte [3] [5]	R 50 Aufnahme-Vorverstärker-Platte [3] [5]	1) Oscilloskop an TP 4 der Aufnahme-Vorverstärkerplatte [3] [5] anschließen. 2) Mit R 50 auf der Aufnahme-Vorverstärker-Platte [3] [5] den Pegel auf 1,3 ± 0,05 V_{ss} einstellen.
2. REC FM Level	REC LP Color bar	TP 4 PRE REC board [3] [5]	R 50 PRE REC board [3] [5]	1) Connect an oscilloscope to TP 4 of the PRE REC board [3] [5]. 2) Adjust R 50 of the PRE REC board [3] [5] so that level A is 1.3 ± 0.05 V_{p-p}.  A = 1.3±0.05 Vp-p
3. SP REC-Farbpegel und Kanal-Differenz 	MH-2 Farbbalken SP REC Farbbalken PB SP	TP 104 V/A/F-Platte [0] [2]	R 40 Aufnahme-Vorverstärker-Platte [3] [5]	1) Oszilloskop an TP 104 der V/A/F-Platte [0] [2] anschließen. Farbbalkensignal der MH-2 Testcassette abspielen und mit dem TRACKING Regler auf maximum Pegel einstellen. Den größeren Pegel des FM-Paketes als Pegel A notieren. 2) TRACKING-Regler in Mittenposition stellen. 3) Farbbalkensignal aufnehmen und wiedergeben. Mit R 40 auf der Aufnahme-Vorverstärker-Platte [3] [5] den größeren Pegel des Wiedergabe-Signales auf den notierten Pegel A einstellen, so daß beide Amplituden denselben Wert annehmen.
3. SP REC Color Level and Channel Difference	MH-2 Color bar SP REC Color bar PB SP	TP 104 V/A/F board [0] [2]	R 40 PRE REC board [3] [5]	1) Connect an oscilloscope to TP 104 of the V/A/F board [0] [2]. Play color bar signal of the MH-2 Alignment tape and adjust the TRACKING control for maximum waveform. Make a note of the larger of the channel levels as level A. 2) Set the TRACKING control to the center click position. 3) Use a cassette to record a color bar signal, then play back. Adjust R 40 of the PRE REC board [3] [5] so that the larger of the channel levels equals level A.

Einstellung Adjustment	Betriebsart Mode	Meßpunkt Test point	Einstellpunkt Adjuster control	Einstellschritte Remarks
4. LP REC Farbpegel und Kanal-Differenz  	PB MH-2 REC→PB Farbbalken LP	TP 104 V/A/F-Platte [0] [2]	R 41 Aufnahme-Vorverstärker [3] [5]	1) TP 29 und TP 121 kurzschließen. Den größeren Pegel an TP 104 der V/A/F-Platte notieren. 2) Kurzschluß lösen, Eigenaufnahme des Farbbalkensignales im LP-Betrieb wiedergeben. Mit R 41 das Signal auf 80 ± 5 % des unter 1) gemessenen und notierten Signal-Pegels einstellen. Die Differenz zwischen beiden Pegeln beträgt ca. ± 3 dB. Hinweis: Abgleich SP REC Farbpegel unter Pkt. 3. zuerst durchführen. Die Abweichungen der Pegel zwischen Eigenaufnahme und Wiedergabe der MH-2 Testcassette sollte ± 3 dB nicht überschreiten. Während der Wiedergabe des MH-2 Testbandes muß mit Tracking der max. optimierte Pegel eingestellt werden.
4. LP REC Color Level and Channel Difference	PB MH-2 REC→PB Color bar LP Mode	TP 104 V/A/F board [0] [2]	R 41 PRE REC board [3] [5]	1) Short TP 29 and TP 121. Make a note of the larger channel color level at TP 104. 2) Remove the short, then record and playback a color bar signal in the LP mode. Adjust R 41 so that the channel level is 80 ± 5% of that measured under 1). Then confirm a level difference between channels of within ± 3 dB. Notes: Perform the SP mode adjustment first. If larger and smaller level channel reverses between self REC/PB and MH-2 PB, confirm that the total level difference is within ± 3 dB. During MH-2 play-back, adjust tracking for the optimum point.
5. Y NR (NC Balance)	EE SP Farbbalken	TP 23 V/A/F-Platte [0] [2]	R 45 V/A/F-Platte [0] [2]	1) Oszilloskop an TP 23 und mit R 45 auf Minimum Rauschen in der Signalmitte einstellen. (kleiner 5 mV_{SS}). 
5. Y NR (NC Balance)	E-E SP Color bar	TP 23 V/A/F board [0] [2]	R 45 V/A/F board [0] [2]	1) Connect the oscilloscope to TP 23 and adjust R 45 to minimize noise at the waveform center (less than 5 mV_{p-p}).
6. Y NR Eingangs-Pegel	EE Farbbalken SP	TP 21, TP 22 V/A/F-Platte [0] [2]	R 57 V/A/F Platte [0] [2]	1) Mit R 57 auf denselben Y-Pegel an TP 22 und TP 21 einstellen.
6. Y NR Input Level	E-E Color bar SP	TP 21, TP 22 V/A/F board [0] [2]	R 57 V/A/F board [0] [2]	1) Adjust R 57 to obtain the same Y level at TP 22 and TP 21.

Einstellung Adjustment	Betriebsart Mode	Meßpunkt Test point	Einstellpunkt Adjuster control	Einstellschritte Remarks
7. Delay Farbpegel	PB SP Farbbalken	TP 105 V/A/F-Platte [0] [2]	R 168 V/A/F-Platte [0] [2]	1) Den Pegel an TP 105 messen. TP 129 und 130 nach Masse kurzschließen und nochmals messen. 2) Mit R 168 den Pegel für beide Fälle auf gleiche Amplitude einstellen.
7. Delay Color level	PB SP Color level	TP 105 V/A/F board [0] [2]	R 168 V/A/F board [0] [2]	1) Measure the level at TP 105. Then short TP 129 and TP 130 to ground and again measure. 2) To obtain the same level in the both cases, adjust R 168
8. 0,5 H Delay Video Pegel	Suchlauf LP Farbbalken	VIDEO OUT Scart Buchse	R 23 V/A/F-Platte [0] [2]	1) Oszilloskop an VIDEO OUT (Scart-Buchse) anschließen. Mit R 23 den verzögerten und den direkten Pegel auf Gleichheit bei LP- und Eigenaufnahme-Wiedergabesuchlauf einstellen.
8. 0.5 H Delay Video level	Search LP Color bar	VIDEO OUT Scart socket	R 23 V/A/F board [0] [2]	1) Connect oscilloscope to VIDEO OUT (Scart socket) and adjust R 23 so that the direct and the delayed signal levels are the same during LP self-REC/PB Search mode.
9. APC Fehler Phase	PB SP Farbbalken	TP 105 TP 128 V/A/F-Platte [0] [2]	L 33 V/A/F-Platte [0] [2]	1) Zweistrahl-Oszilloskop an TP 105 und TP 128 anschließen. Mit L 33 die Burst Phase (A) und das 7,8 kHz Signal (B) nach Abb. einstellen. 
9. APC Error Phase	PB SP Color bar	TP 105 TP 128 V/A/F board [0] [2]	L 33 V/A/F board [0] [2]	1) Connect dual trace oscilloscope to TP 105 and TP 128. Adjust the core of L 33 to obtain the relationship between the burst phase (A) and 7.8 kHz waveform phase (B) indicated in the Fig.

Einstellung Adjustment	Betriebsart Mode	Meßpunkt Test point	Einstellpunkt Adjuster control	Einstellschritte Remarks
10. 0,5 H Delay Sprung Detektor	EE Kein Signal	TP 132 V/A/F-Platte [0] [2]	R 160 V/A/F-Platte [0] [2]	1) Eingangswahlschalter auf oo stellen. Kein Eingangssignal einspeisen. Den abgebildeten Meßaufbau anschließen. 2) Mit R 160 an TP 132 die Frequenz auf 30 ± 0,2 kHz einstellen. 
10. 0.5 H Delay Jump Det	E-E No signal	TP 132 V/A/F board [0] [2]	R 160 V/A/F board [0] [2]	1) Connect the circuit shown in the figure. Set the input selector switch to oo. No input signal 2) Adjust R 160 to obtain 30 ± 0.2 kHz at TP 132.
11. SECAM AMP	EE Secam Farbbalken	TP 110 V/A/F-Platte [0] [2]	R 191 V/A/F-Platte [0] [2]	1) Mit R 191 auf 8 V_{ss} an TP 110 einstellen.
11. SECAM AMP	E-E SECAM Color bar	TP 110 V/A/F board [0] [2]	R 191 V/A/F board [0] [2]	1) Adjust R 191 for 8 V_{p-p} at TP 110.
12. SECAM DET	EE Secam Farbbalken	TP 110 V/A/F-Platte [0] [2]	L 34 V/A/F-Platte [0] [2]	1) L 34 so abgleichen, daß der Übergang an TP 110 zwischen A und B liegt. 2) PAL und SECAM-Eigenaufnahme im LP-Betrieb wiedergeben. Bei der Wiedergabe auf einem Monitor sollten keine Unterschiede sichtbar sein.  Set this point to center position between points "A" and "B".
12. SECAM DET	E-E SECAM Color bar	TP 110 V/A/F board [0] [2]	L 34 V/A/F board [0] [2]	1) Adjust the core of L 34 so that the transition step at TP 110 becomes centered between A and B. 2) Record and play-back PAL and SECAM signals in the LP mode. Observe the picture on a monitor and confirm normal operation and presence of color in both cases.

Einstellung Adjustment	Betriebsart Mode	Meßpunkt Test point	Einstellpunkt Adjuster control	Einstellschritte Remarks
[0] [2] Audio				
1. Vormagnetisierungs-Pegel	REC SP 1 kHz	TP 402 V/A/F-Platte [0] [2]	R 434 V/A/F-Platte [0] [2]	1) Millivoltmeter zwischen TP 402 und TP 403 der V/A/F-Platte [0] [2] anschließen. 2) Im SP REC-Betrieb mit R 434 auf 2,6 mVeff einstellen.
1. Bias Level	REC SP 1 kHz	TP 402 V/A/F board [0] [2]	R 434 V/A/F board [0] [2]	1) Use a millivoltmeter to measure voltage between TP 402 and TP 403 on the V/A/F board [0] [2]. 2) In the SP REC mode, adjust R 434 to obtain 2.6 mVrms.
2. REC/PB Pegel	SP REC→PB 1 kHz	Audio Out	R 423 V/A/F-Platte [0] [2]	1) An die Audio-Eingänge ein 1 kHz Sinussignal mit -8 dBs einspeisen. 2) Millivoltmeter an die Audio Ausgänge anschließen und mit R 423 (PB. LEVEL) den REC/PB-Pegel auf -6dBs einstellen.
2. REC/PB level	SP REC→PB 1 kHz	Audio Out	R 423 V/A/F board [0] [2]	1) Apply a 1 kHz -8dBs sinewave signal to the audio inputs. 2) Use a millivoltmeter to measure the audio output terminals. So that the audio REC/PB level is -6dBs, adjust R 423 (PB. LEVEL)
[0] [2] FM Audio				
1. EE-Pegel	EE Eingang: Ext. 1 kHz -8dBs Taste M eingerastet	Audio Out	R 247 CH-1 R 250 CH-2	1) An die Audio-Eingänge ein 1 kHz Signal mit -8dBs einspeisen. 2) Den Audio-Taster M einrasten. 3) Mit R 247 (CH-1) and R 250 (CH-2) an den Audio-Ausgängen auf -6dBs einstellen.
1. E-E level	E-E Input: Ext. 1 kHz -8dBs Switch M ON	Audio Out	R 247 CH-1 R 250 CH-2	1) Supply 1 kHz -8dBs signals to the audio inputs (both channels). 2) Set the switch M to ON. 3) Adjust R 247 (CH-1) and R 250 (CH-2) to obtain -6dBs at the audio outputs.
2. REC FM Pegel	REC Onne Signal	TP 201 (REC FM)	R 228	1) Ohne Eingangssignal auf REC gehen. 2) Mit R 228 an TP 201 die Amplitude auf 2,2 V_{ss} einstellen.
2. REC FM level	REC No Signal	TP 201 (REC FM)	R 228	1) Without an audio input signal, set for the REC mode. 2) Adjust R 228 to obtain 2.2 V_{p-p} at TP 201.
3. PB-Pegel	PB Schalter MIX auf Hifi	Audio Out	R 236 CH-1 R 235 CH-2	1) MH-F 2 Testcassette mit 1 kHz ± 50 Hz abspielen. 2) Mit R 236 (CH-1) und R 235 (CH-2) die Pegel an den Audio-Ausgängen auf -9dBs einstellen.
3. PB level	PB Switch MIX to Hi-fi	Audio Out	R 236 CH-1 R 235 CH-2	1) Play 1 kHz ± 50 Hz deviation signal of MH-F2 Alignment tape. 2) Adjust R 236 (CH-1) and R 235 (CH-2) to obtain -9dBs audio output levels.
4. Aussteuer-Pegel	EE Eingang: 1 kHz, -8dBs	Aussteuer-Anzeige	R 289 CH-1 R 290 CH-2	1) An die Audio-Eingänge ein 1 kHz Signal mit -8dBs einspeisen. 2) Taster M ausgerastet. 3) Im EE-Betrieb die Aussteuerregler so einstellen, daß an den Audio-Ausgängen ein Signal-Pegel von -6dBs steht. 4) Mit R 289 (CH-1) und R 290 (CH-2) die Aussteuer-Anzeige auf 0dB einstellen.
4. Level indicators	E-E Input: 1 kHz -8dBs	FDP (LEVEL IND)	R 289 CH-1 R 290 CH-2	1) Supply 1 kHz -8dBs signals to both audio inputs. 2) Set the Switch M to OFF. 3) In the E-E mode, adjust the front panel Hi-fi REC LEVEL controls for -6dBs audio output levels. 4) Adjust R 289 (CH-1) and R 290 (CH-2) for 0 dB indication on the level meters.

Einstellung Adjustment	Betriebsart Mode	Meßpunkt Test point	Einstellpunkt Adjuster control	Einstellschritte Remarks
[4] Tuner/ZF Tuner/IF				
1. VPS Y-Pegel	Moduliertes Signal	Stecker CN-3 Stift 1 (VPS OUT)	R 16	1) Ein 87,5% moduliertes Signal einspeisen. Mit R 16 den Y-Pegel einschließlich Sync.-Impuls auf 2,0 V_{SS} an Stecker CN 3 Stift 1 einstellen.
1. VPS Y Level	Modulated Signal	CN 3 Pin 1 (VPS OUT)	R 16	1) Receive an 87.5% modulated signal. Adjust R 16 to obtain a Y level (including sync.) of 2.0 V_{p-p} from pin 1 (VPS OUT) of CN 3.
2. Farbpegel	Farbbalken-Signal	Stecker CN2 Stift 3 (VIDEO OUT)	R 42	1) Farbbalken-Signal empfangen. Y-Pegel als 100% angenommen. Mit R 42 den Magenta Pegel auf 48% an Stecker CN 2 Stift 3 (VIDEO OUT) einstellen.
2. Colour Level	Colour bar	CN 2 Pin 3	R 42	1) Receive a colour bar signal. With Y level taken as 100%, adjust R 42 for magenta level of 48% at pin 3 (VIDEO OUT) of CN 2.  B : magenta E/EG A:B = 1:0.44 EK A:B = 1:0.48

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Allgemeine Bauteile **General Parts**		
RF 1	Antennenverstärker Mix Booster Modulator RF Converter	5826 01 92
P 109, [M] [4]	Capstan-Motor	4432 92 31
[M] [5]	Cassettenschacht kpl. Cassette housing incl.	8318 45 53
P 18, [M] [5]	Cassettenschacht-Motor Cassette housing motor	4432 91 70
P 43, [M] [4]	Gesamt-Löschkopf Full erase head	4337 91 39
	IR-Sender kpl. IR Transmitter incl.	5652 21 29
P 21, [M] [3]	Kopftrommel Head drum	4335 92 23
P 57, [M] [3]	⚠ Netztrafo Power transformer	4511 33 70
TWR 1	Tuner	5823 07 33
Lehren und Werkzeuge **Required Jigs and Tools**		
	Abgleichband MH-2 Alignment Tape MH-2	1318 88 33
	Abgleichband MH-F2 Alignment Tape MH-F2	1318 88 65
	Schlüssel für Audio/Sync.-Kopf A/CTL head position tool	1318 88 42
	Drehmomentmesser Torque gauge meter	1318 88 56
	Kopf für Drehmomentmesser Torque meter head	1318 88 53
	Bandzug-Messcassette Back tension cassette gauge	1318 88 58
Zubehör **Accessory**		**TR 4997**
	Bedienungsanleitung Instruction book	6612 41 61
	Verpackungskarton Packing Case	6162 39 67
	Verpackungspolster Cushion Assy.	6172 07 52
	Antennenkabel Arial Cable	4131 41 20
	Chinchkabel chinch cable	4131 41 73

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Zubehör **Accessory**		VR 3997
	Bedienungsanleitung Instruction book	6612 41 60
	Verpackungskarton Packing Case	6162 39 68
	Verpackungspolster Cushion Assy.	6172 07 52
	Antennenkabel Arial Cable	4131 41 20
	Chinchkabel chinch cable	4131 41 73
0 1	**Netzteil (1)-Platte** **Regulator (1) Circuit Board**	
Transistoren/Transistors		
Q 2, 4	2 SD 1275 P,Q	3614 52 26
Q 5, 8	2 SD 637 R	3614 47 12
Q 10	2 SD 1275 P,Q	3614 52 26
Q 11	2 SD 637 R	3614 47 12
Q 12	2 SD 1761	3614 55 38
Q 13	2 SD 637 R	3614 47 12
Q 14	2 SC 3243 D,E	3614 49 92
Q 15	2 SB 1015 Y	3614 52 12
Dioden/Diodes		
D 2, 4	10 E 2	3656 22 33
D 5	HZ 12B-3L	3656 21 83
D 8	11 E 2	3656 27 89
D 9	HZ 6C1L	3656 28 14
D 10	11 E 2	3656 27 89
D 11	HZ 6C1L	3656 28 14
D 12, 13	11 E 2	3656 27 89
D 14	HZ 15-2	3656 27 62
D 15	MA 150	3656 08 58
D 16	HZ 15-2	3656 27 62
D 17 - 20	11 E 2	3656 27 89
D 21	MA 27 TB	3656 22 99
D 22	HZ 6C1L	3656 28 14
D 23	MA 27 TA	3656 22 94
DS 1	5 SB 10	3656 30 06

Trimmer-Widerstände/Trimmer Resistors

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
R 15	220 Ohm	3111 87 66
R 21	2,2 kOhm	3111 86 86

Elkos/Electrolytic Capacitors

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
C 2	1000 uF 25 V	3422 99 03
C 4	3300 uF 25 V	3422 99 04
C 5, 6, 7	100 uF 16 V	3422 27 84
C 8	220 uF 16 V MIN	3422 85 18
C 9	33 uF 35 V	3422 08 62
C 10	47 uF 25 V	3422 37 52
C 11	100 uF 63 V MIN	3422 87 12
C 12, 13	220 uF 50 V	3422 58 27
C 14	100 uF 50 V MIN	3422 86 35

Allgemeine Bauteile/General Parts

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
F 2	⚠ Sicherung 2,5 AT Fuse 2,5 AT	4375 10 44
F 3	⚠ Sicherung 0,8 AT Fuse 0,8 AT	4375 16 14
R 24	Heißleiter-NTC Posistor	3172 91 02

0 2 V/A/F-Platte
V/A/F Circuit Board

Video-Teil
Video Section

Integrierte Schaltungen/Integrated Circuits

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
IC 1	MSM 6967	3771 49 45
IC 2	MSM 6989	3771 49 46
IC 3	BA 7021	3771 46 75
IC 4	TA 7374 P	3771 49 53
IC 5	BA 225	3771 49 36
IC 6	M 51458 P	3771 49 51
IC 7	7 VT 12	3771 48 95
IC 8	Y Modul	3771 49 15
IC 9	NJM 2207 S	3771 49 52
IC 10	HA 11811	3771 47 87
IC 11	AN 3592 K	3771 46 63
IC 12	BA 7007	3771 44 42

Transistoren/Transistors

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Q 1	2 SC 1740 S	3614 49 90
Q 2	2 SA 933 S	3614 55 40
Q 3, 4	2 SC 1740 S	3614 49 90
Q 5	2 SA 933 S	3614 55 40
Q 6	2 SC 1740 S	3614 49 90
Q 7	2 SC 2021 RS	3614 47 18
Q 8	2 SC 1740 S	3614 49 90
Q 9	DTC 124 ES	3614 52 34
Q 10	DTC 144 ES	3614 52 27
Q 11, 12	DTC 124 F	3614 48 57
Q 13	2 SC 1740 S	3614 49 90
Q 14	DTC 114 ES	3614 52 31
Q 15 - 18	DTC 144 WS	3614 52 35
Q 20	DTC 124 F	3614 48 57
Q 21	2 SC 2021 RS	3614 47 18
Q 22 - 24	2 SC 1740 S	3614 49 90
Q 25	2 SA 933 S	3614 55 40
Q 26 - 28	2 SC 1740 S	3614 49 90
Q 29, 30	2 SA 933 S	3614 55 40
Q 31	2 SC 1740 S	3614 49 90
Q 33, 34	DTC 124 ES	3614 52 34
Q 35	DTC 144 WS	3614 52 35
Q 36 - 38	2 SC 1740 S	3614 49 90
Q 39, 40	DTC 114 ES	3614 52 31
Q 41	DTC 144 ES	3614 52 27
Q 42	DTC 144 WF	3614 48 71
Q 43	DTA 114 F	3614 48 86
Q 44	DTA 114 ES	3614 52 03
Q 45	2 SA 937	3614 84 92
Q 46	DTC 144 WS	3614 52 35
Q 50 - 53	2 SC 1740 S	3614 49 90
Q 54	DTC 124 ES	3614 52 34
Q 56	2 SC 1740 S	3614 49 90
Q 58	DTC 124 ES	3614 52 34
Q 59, 60	2 SC 1740 S	3614 49 90
Q 63	DTC 124 ES	3614 52 34
Q 64	2 SC 2021 RS	3614 47 18

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Q 65, 66	DTA 124 ES	3614 52 51
Q 67	DTC 144 WF	3614 48 71
Q 69	DTC 124 F	3614 48 57
Transistoren/Transistors		
D 1 - 13	1 SS 133	3656 22 30
D 14, 15	OA 90	3662 06 01
D 16 - 62	1 SS 133	3656 22 30
Trimmer-Widerstände/Trimmer Resistors		
R 23	6,8 kOhm	3111 85 92
R 45	1 kOhm	3111 85 89
R 57	4,7 kOhm	3111 86 40
R 149	47 kOhm	3111 85 88
R 150	22 kOhm	3111 87 67
R 151	680 kOhm	3111 87 68
R 152	470 kOhm	3111 87 69
R 153	1 MOhm	3111 87 70
R 160	47 kOhm	3111 85 88
R 168	2,2 kOhm	3111 85 94
R 179	22 kOhm	3111 85 93
R 191	1 kOhm	3111 85 89
Elkos/Electrolytic Capacitors		
C 1, 4	4,7 uF 25 V	3422 41 05
C 5	330 uF 50 V	3422 85 83
C 8	4,7 uF 6,3 V	3422 99 05
C 10	47 uF 10 V MIN	3422 85 31
C 12	4,7 uF 25 V	3422 41 05
C 15	4,7 uF 6,3 V	3422 99 05
C 17	47 uF 10 V MIN	3422 85 31
C 21 - 25	4,7 uF 6,3 V	3422 99 05
C 27	1 uF 50 V	3422 08 14
C 28	10 uF 50 V	3422 86 19
C 29	330 uF 50 V	3422 85 83
C 30	10 uF 16 V MIN	3422 85 30
C 31	10 uF 50 V	3422 86 19
C 35	4,7 uF 6,3 V	3422 99 05
C 38	4,7 uF 25 V	3422 41 05
C 41	4,7 uF 6,3 V	3422 99 05

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
C 49	22 uF 10 V MIN	3422 85 45
C 50	4,7 uF 25 V	3422 41 05
C 51	10 uF 16 V MIN	3422 85 30
C 52	2,2 uF 50 V MIN	3422 85 09
C 53	22 uF 10 V MIN	3422 85 45
C 54	4,7 uF 6,3 V	3422 99 05
C 57	22 uF 10 V MIN	3422 85 45
C 59	4,7 uF 6,3 V	3422 99 05
C 61 - 65	22 uF 10 V MIN	3422 85 45
C 80	220 uF 6,3 V	3422 23 13
C 82	3,3 uF 25 V MIN	3422 85 41
C 83	1 uF 50 V	3422 08 14
C 87	2,2 uF 50 V MIN	3422 85 09
C 88	3300 uF 50 V	3422 85 84
C 89	2,2 uF 50 V MIN	3422 85 09
C 90	10 uF 16 V MIN	3422 85 30
C 92	470 uF 6,3 V	3422 87 16
C 93	4,7 uF 6,3 V	3422 99 05
C 97	100 uF 16 V	3422 28 29
C 99	0,47 uF 50 V	3422 61 02
C 100	4,7 uF 25 V	3422 41 05
C 103, 105	10 uF 16 V MIN	3422 85 30
C 106	2,2 uF 50 V MIN	3422 85 09
C 109	3,3 uF 25 V MIN	3422 85 41
C 112	4,7 uF 25 V	3422 41 05
C 113	33 uF 10 V MIN	3422 85 37
C 114	4,7 uF 6,3 V	3422 99 05
C 116	10 uF 50 V	3422 86 19
C 122, 123	4,7 uF 25 V	3422 41 05
C 125	47 uF 16 V MIN	3422 85 42
C 128	100 uF 6,3 V	3422 17 12
C 134 - 143	10 uF 50 V	3422 86 19
C 144	4,7 uF 25 V	3422 41 05
C 145, 148	10 uF 50 V	3422 86 19
C 152	10 uF 16 V MIN	3422 85 30
C 153	47 uF 10 V MIN	3422 85 31
C 155	33 uF 10 V MIN	3422 85 37
C 159	10 uF 16 V MIN	3422 85 30
C 161	2,2 uF 50 V MIN	3422 85 09

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
C 162	330 uF 6,3 V	3422 17 14
C 164, 168	22 uF 16 V MIN	3422 85 46
C 173	33 uF 10 V MIN	3422 85 37
C 174	2,2 uF 50 V MIN	3422 85 09
Spulen/Coils		
L 1		4543 95 25
L 2		4543 98 55
L 3		4543 95 25
L 4		4543 98 55
L 5, 6		4543 18 99
L 7 - 10		4543 95 25
L 11		4543 19 80
L 12		4543 95 25
L 13		4543 18 99
L 15		4543 19 80
L 16		4543 95 25
L 17		4543 93 66
L 18		4543 95 43
L 19		4543 19 71
L 20		4543 18 99
L 21		4543 95 25
L 22		4543 20 50
L 23		4543 95 25
L 24		4543 19 73
L 25		4543 18 99
L 26		4543 95 25
L 27		4543 19 80
L 28		4543 19 65
L 29		4543 95 25
L 30		4543 20 51
L 31		4543 95 25
L 32		4543 99 48
L 33, 34		4543 92 64
L 35, 36		4543 95 25
L 37		4543 20 52
L 38		4543 96 33

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Filter/Filters		
LPF 1		4552 49 02
LPF 2		4552 92 97
BPF 1		4552 92 52
BPF 2		4552 92 45
DL 1		4552 94 75
CF 1		4552 92 50
EQ 1		4552 93 98
EQ 2		4552 91 68
Allgemeine Bauteile/General Parts		
X 1	Quarz Crystal Block	4421 24 31
XB 1	Quarz Crystal Block	4421 24 40

Audio-Teil
Audio Section

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Integrierte Schaltungen/Integrated Circuits		
IC 401	TA 7361 AP	3771 47 85
IC 402	AN 3991 K	3771 47 67
Transistoren/Transistors		
Q 401, 402	DTC 124 ES	3614 52 34
Q 403, 404	2 SC 1740 S	3614 49 90
Q 405	2 SC 2021 RS	3614 47 18
Q 406-408	2 SA 933 S	3614 55 40
Q 409	DTC 124 ES	3614 52 34
Dioden/Diodes		
D 401-407	MA 165	3656 29 25
Trimmer-Widerstände/Trimmer Resistors		
R 423	2,2 kOhm	3111 86 31
R 434	68 kOhm	3111 85 95
Elkos/Electrolytic Capacitors		
C 401	3,3 uF 25 V MIN	3422 85 41
C 402-404	4,7 uF 25 V	3422 41 05
C 405	33 uF 10 V MIN	3422 85 37
C 406	0,47 uF 50 V MIN	3422 85 56
C 408	47 uF 16 V MIN	3422 85 42
C 409	0,47 uF 50 V MIN	3422 85 56

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
C 413, 414	3,3 uF 25 V MIN	3422 85 41
C 418	47 uF 25 V	3422 37 52
C 419	0,33 uF 50 V	3422 87 07
C 421	1 uF 50 V MIN	3422 82 28
C 423	47 uF 10 V MIN	3422 85 31
C 424	47 uF 16 V MIN	3422 85 42
C 427	10 uF 16 V MIN	3422 85 30
C 431	33 uF 16 V	3422 87 67
C 434	2,2 uF 50 V MIN	3422 85 09

Spulen/Coils

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
L 401		4543 19 15
L 402, 403		4543 18 47
L 404		4543 20 53

Filter/Filters

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
T 401		4552 93 70
T 402		4552 93 71

Allgemeine Bauteile/General Parts

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
R 448	PTC/Posistor	3172 91 95
R 449	PTC/Posistor	3172 91 76

FM Audio-Teil
FM Audio Section

Integrierte Schaltungen/Integrated Circuits

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
IC 202	TA 78 L 005 AP	3771 46 92
IC 204	VC 2024 A	3771 48 96
IC 205	BA 7057	3771 48 96
IC 206	HA 12072 NT	3771 48 71
IC 207	uPD 4053 BC	3771 49 58
IC 208	AN 3926 K	3771 48 68
IC 209	M 5218 P	3771 46 91

Transistoren/Transistors

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Q 201	2 SC 1740 S	3614 49 90
Q 202	2 SB 643 Q	3614 48 12
Q 203	2 SD 638 Q	3614 48 06
Q 204	2 SB 643 Q	3614 48 12
Q 205	2 SC 1740 S	3614 49 90
Q 206	2 SC 1740 S	3614 49 90
Q 207	2 SB 810 H,J	3614 52 01
Q 208	DTC 124 ES	3614 52 34
Q 209	DTC 124 F	3614 48 57
Q 210, 211	2 SC 2021 RS	3614 47 18
Q 214	2 SB 641 Q	3614 36 71
Q 215	2 SB 810 H,J	3614 52 01
Q 216	DTA 124 ES	3614 52 51
Q 217	2 SD 638 Q	3614 48 06
Q 218	2 SC 1740 S	3614 49 90
Q 219	2 SC 2021 RS	3614 47 18
Q 220	DTC 144 ES	3614 52 27
Q 221	2 SD 638 Q	3614 48 06
Q 223	DTC 124 ES	3614 52 34
Q 224	DTC 114 ES	3614 52 31
Q 225	DTC 114 ES	3614 52 31

Dioden/Diodes

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
D 201 - 207	1 SS 133	3656 22 30

Trimmer-Widerstände/Trimmer Resistors

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
R 228	10 kOhm	3111 85 96
R 235, 236	1 kOhm	3111 86 32
R 247, 250	4,7 kOhm	3111 85 97
R 267, 268	10 kOhm	3111 85 96
R 289, 290	4,7 kOhm	3111 85 97

Wid.-Netzwerke/Resistor Arrays

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
RA 201 - 204		3722 25 63

Elkos/Electrolytic Capacitors

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
C 208	47 uF 16 V MIN	3422 85 42
C 217	10 uF 16 V MIN	3422 85 30
C 218	10 uF 16 V BIP	3422 86 14
C 220	10 uF 16 V MIN	3422 85 30
C 222	470 uF 6,3 V	3422 87 16
C 223	10 uF 63 V	3422 65 32
C 224 - 233	10 uF 16 V MIN	3422 85 30
C 234	10 uF 6,3 V	3422 17 12
C 235 - 240	10 uF 16 V MIN	3422 85 30
C 241	100 uF 6,3 V	3422 17 12
C 242	100 uF 6,3 V MIN	3422 85 26
C 243	47 uF 16 V	3422 30 11
C 244 - 247	10 uF 16 V MIN	3422 85 30

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
C 248	10 uF 50 V	3422 86 19
C 249, 251	4,7 uF 6,3 V	3422 99 05
C 253	100 uF 6,3 V	3422 17 12
C 254, 255	10 uF 16 V MIN	3422 85 30
C 256	1000 uF 6,3 V MIN	3422 86 84
C 257	10 uF 16 V MIN	3422 85 30
C 258, 259	10 uF 50 V	3422 86 19
C 260	10 uF 16 V MIN	3422 85 30
C 261 - 262	47 uF 16 V MIN	3422 85 42
C 265 - 272	10 uF 16 V MIN	3422 85 30
C 273	47 uF 16 V MIN	3422 85 42
C 274 - 283	10 uF 16 V MIN	3422 85 30
C 285	47 uF 16 V MIN	3422 85 42
C 286, 287	1 uF 50 V MIN	3422 86 94
C 289 - 291	10 uF 16 V MIN	3422 85 30
C 296	47 uF 16 V MIN	3422 85 42
C 299	47 uF 10 V MIN	3422 85 31
C 301	4,7 uF 6,3 V	3422 99 05
C 302 - 305	10 uF 16 V MIN	3422 85 30
C 306	10 uF 50 V	3422 86 19
C 309	47 uF 16 V MIN	3422 85 42
C 312	220 uF 6,3 V	3422 23 13
C 313	47 uF 16 V MIN	3422 85 42
C 317 - 325	10 uF 16 V MIN	3422 85 30
C 326	220 uF 10 V MIN	3422 85 29
C 327	4,7 uF 25 V	3422 41 05
C 329	10 uF 16 V MIN	3422 85 30
C 330	1 uF 50 V	3422 08 14
Spulen/Coils		
L 202		4552 93 68
L 203		4552 93 67
L 204, 205		4543 95 25
L 206 - 211		4543 19 13

0 3 **Ablaufsteuerungs-Platte**
Mechanism Control Circuit Board
Servo-Platte
Servo Circuit Board
Timer-Platte
Timer Circuit Board

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Timer-Teil **Timer Section**		
Integrierte Schaltungen/Integrated Circuits		
IC 1	M 5278 L 56	3771 48 77
IC 2	S 8053 HLB	3771 48 79
IC 101	uPD 75208 CW-041	3771 50 96
IC 102	uPD 82 C 43 CY	3771 49 62
IC 103	TC 4071 BP	3771 49 54
IC 104	uPD 7538 ACU-205	3771 50 97
IC 105	M 50452-024 P	3771 49 48
IC 106	TC 4001	3763 14 88
IC 107	MSM 5258 RS	3771 49 44
Transistoren/Transistors		
Q 2	2 SC 1685 R,S	3614 52 56
Q 3	2 SC 2021 RS	3614 47 18
Q 4	2 SC 1685 R,S	3614 52 56
Q 5	2 SD 1330 S,T	3614 52 02
Q 102	DTC 124 ES	3614 52 34
Q 103	2 SC 2021 RS	3614 47 18
Q 104	DTC 114 ES	3614 52 31
Q 105	2 SC 2021 RS	3614 47 18
Q 108	DTC 114 ES	3614 52 31
Q 109	DTC 124 ES	3614 52 34
Dioden/Diodes		
D 3, 4	1 SS 133	3656 22 30
D 5	10 ES-T1B	3656 29 35
D 6 - 107	1SS 133	3656 22 30
Trimmer-Widerstände/Trimmer Resistors		
R 10	2,2 kOhm	3111 85 02
Wid.-Netzwerke/Resistor Arrays		
RA 101, 102		3722 11 79
RA 103		3722 25 92
RA 104		3722 25 93
RA 106		3722 25 94
RA 107		3722 25 95
RA 108		3722 11 14

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Elkos/Electrolytic Capacitors		
C 1	100 uF 25 V MIN	3422 85 21
C 3	100 uF 16 V	3422 28 29
C 4	33 uF 16 V	3422 87 67
C 7	47 uF 25 V	3422 37 52
C 15	47 uF 10 V MIN	3422 85 31
Filter/Filters		
CF 102		4552 93 99
CF 103		4552 90 32
Schalter/Switches		
S 1		4112 96 17
Allgemeine Bauteile/General Parts		
R 21	PTC/Posistor	3172 91 78
C 102	Trimmer	3412 90 40
X 101	Quarz Crystal Block	4421 24 24
X 104	Quarz Crystal Block	4421 24 41
Ablaufsteuerungs-Teil Mechacon Section		
Integrierte Schaltungen/Integrated Circuits		
IC 201	TMS 1035 NE	3771 49 55
IC 202	M 50742-621 SP	3771 49 49
IC 204	BA 7750 AL	3771 49 37
IC 205	BU 4013 B	3771 49 38
IC 206	BA 6238	3771 47 79
Transistoren/Transistors		
Q 201	2 SC 3243 D,E	3614 49 92
Q 203	2 SC 1741	3614 38 76
Q 204	DTC 124 ES	3614 52 34
Q 205	2 SC 1741	3614 38 76
Q 206	2 SD 637 R	3614 47 12
Q 207	2 SD 1406 Y	3614 52 24
Q 209 - 212	DTC 124 ES	3614 52 34
Dioden/Diodes		
D 201	1 SS 133	3656 22 30
D 202	MA 27 WA	3656 22 95
D 203	RD 6,8 ES-T1B2	3656 29 19

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
D 204 - 206	1 SS 133	3656 22 30
D 207	RD 6,8 ES-T1B2	3656 29 19
D 214 - 216	1 SS 133	3656 22 30
D 217	RD 15 ES-T1B1	3656 29 77
D 219	1 SS 133	3656 22 30
D 220	RD 8,2 ES-T1B2	3656 29 21
D 221	1 SS 133	3656 22 30
DA 201	DAN 201	3656 28 06
Wid.-Netzwerke/Resistor Arrays		
RA 201		3722 25 96
RA 202		3722 25 78
RA 204		3722 25 97
RA 205		3722 25 66
RA 206		3722 25 47
Elkos/Electrolytic Capacitors		
C 204	2,2 uF 50 V MIN	3422 85 09
C 210	47 uF 16 V MIN	3422 85 42
C 211	1 uF 50 V	3422 08 14
C 212, 213	2,2 uF 50 V MIN	3422 85 09
C 214	1 uF 50 V	3422 08 14
C 215, 216	0,47 uF 50 V MIN	3422 85 56
C 217	47 uF 16 V MIN	3422 85 42
C 219	100 uF 16 V	3422 27 84
C 221	1 uF 50 V	3422 08 14
C 224	10 uF 16 V MIN	3422 85 30
Filter/Filters		
CF 201		4552 92 49
Spulen/Coils		
L 201		4543 99 46
L 202		4543 99 41
Allgemeine Bauteile/General Parts		
R 201	PTC/Posistor	3172 91 05

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Servo-Teil **Servo Section**		
Integrierte Schaltungen/Integrated Circuits		
IC 401	M 51795 P	3771 48 47
IC 402	BU 2710 SA	3771 48 45
IC 403	MB 84066 BM	3771 41 24
IC 404	IR 3702	3771 49 43
IC 405	M 5218 P	3771 46 91
IC 406	uPC 393 C	3771 44 71
IC 407	DN 819	3771 49 39
IC 408	M 50766-603 P	3771 49 50
IC 409	uPC 358 C	3771 41 52
IC 410	M 51722 P	3771 46 90
IC 411	uPD 1511 ACU-615	3771 49 56
IC 412	BA 236	3771 46 72
IC 413	DN 819	3771 49 39
Transistoren/Transistors		
Q 401	2 SC 3311 Q,R	3614 52 59
Q 402	2 SA 1309	3614 55 03
Q 403	DTA 144 ES	3614 52 52
Q 404	DTC 144 ES	3614 52 27
Q 405	2 SA 1309	3614 55 03
Q 406	2 SD 636 Q	3614 36 78
Q 408, 410	DTA 124 ES	3614 52 51
Q 411	DTC 144 ES	3614 52 27
Q 412 - 417	DTC 124 ES	3614 52 34
Q 419	2 SA 1309	3614 55 03
Q 420	2 SA 1309 S	3614 52 54
Q 421	DTC 144 WS	3614 52 35
Q 422	DTC 144 ES	3614 52 27
Q 431	2 SD 636 Q	3614 36 78
Q 432	2 SA 1309 Q,R	3614 52 53
Q 433	2 SC 3311 Q,R	3614 52 59
Q 434	DTC 144 ES	3614 52 27
Q 435	DAT 144 WS	3614 55 39
Q 437	DTC 144 WF	3614 48 71
Q 438	DTC 144 ES	3614 52 27

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Dioden/Diodes		
D 401	DA 210 S	3656 29 76
D 402, 403	1 SS 133	3656 22 30
D 404	DAN 209 S	3656 29 74
D 405	1 SS 133	3656 22 30
D 406	RD 5,1 EB 3	3656 29 31
D 407 , 408	DA 210 S	3656 29 76
D 409	1 SS 133	3656 22 30
D 410	DA 210 S	3656 29 76
D 412	RD 13 EB 2	3656 28 79
D 413, 414	1 SS 133	3656 22 30
D 415	DAN 209 S	3656 29 74
D 416	DAP 201	3656 27 79
D 417	DAN 201	3656 28 06
D 418 - 422	1 SS 133	3656 22 30
D 423	DA 210 S	3656 29 76
D 424 - 435	1 SS 133	3656 22 30
D 436	DAN 201	3656 28 06
D 438 - 440	1 SS 133	3656 22 30
D 441, 442	DAP 209 S	3656 29 75
D 444	1 SS 133	3656 22 30
D 445	DAP 209 S	3656 29 75
D 446	1 SS 133	3656 22 30
Trimmer-Widerstände/Trimmer Resistors		
R 423		3111 86 87
Wid.-Netzwerke/Resistor Arrays		
RA 401, 402		3722 25 98
Elkos/Electrolytic Capacitors		
C 406, 407	10 uF 16 V MIN	3422 85 30
C 408	47 uF 63 V MIN	3422 86 54
C 412	1 uF 50 V	3422 08 14
C 413	3,3 uF 25 V MIN	3422 85 41
C 415	47 uF 16 V MIN	3422 85 42
C 426, 427	10 uF 16 V MIN	3422 85 30
C 428, 429	47 uF 25 V	3422 37 52
C 436 - 440	10 uF 16 V MIN	3422 85 30
C 444	0,47 uF 50 V MIN	3422 85 56
C 446	1 uF 50 V	3422 08 14
C 449, 450	10 uF 16 V MIN	3422 85 30

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
C 452	1 uF 50 V	3422 08 14
C 454	22 uF 16 V	3422 30 08
C 455, 459	10 uF 16 V MIN	3422 85 30
C 463	0,1 uF 50 V MIN	3422 85 55
C 482, 483	10 uF 16 V MIN	3422 85 30
C 485	47 uF 10 V SMI	3422 86 39
Spulen/Coils		
L 401, 402		4543 95 85
Filter/Filters		
CF 401		4552 92 87
Allgemeine Bauteile/General Parts		
PTH 401	PTC/Posistor	3172 91 05
X 401	Quarz Crystal Block	4421 24 27

0 4 Tuner/ZF-Platte
Tuner/IF Circuit Board

Integrierte Schaltungen/Integrated Circuits		
IC 1	M 51365 SP	3771 48 76
IC 2	M 50440-394 SP	3771 50 98
IC 3	M 58655 P	3771 49 25
IC 4	H 8 D 7013	3771 49 42
Transistoren/Transistors		
Q 1	2 SC 3354 S,T	3614 52 45
Q 3, 4, 6, 7	2 SC 1740 S	3614 49 90
Q 5	2 SA 933 S	3614 55 40
Q 9 - 12	2 SA 933 S	3614 55 40
Q 13	2 SK 381 C	3614 48 76
Q 14	2 SC 1740 S	3614 49 90
Q 15, 16	2 SD 1292 T 103 QR	3614 52 46
Q 17	2 SB 810 H,J	3614 52 01
Q 18	DTA 124 ES	3614 52 51
Q 24	2 SC 3354 S,T	3614 52 45
Dioden/Diodes		
D 1-5	1 SS 133	3656 22 30
D 6	HZ 30-2	3656 29 66
D 7	MTZ 10 B	3656 29 68

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
D 10	E 452	3656 29 60
D 11	RD 6,2 ES-T1B1	3656 30 05
D 12	1 SS 133	3656 22 30
Trimmer-Widerstände/Trimmer Resistors		
R 11	4,7 kOhm	3111 85 97
R 16, 42	10 kOhm	3111 85 96
Wid.-Netzwerke/Resistor Arrays		
RA 1		3722 25 83
Elkos/Electrolytic Capacitors		
C 7	0,47 uF 50 V	3422 99 07
C 8	33 uF 16 V	3422 87 67
C 11	0,47 uF 50 V	3422 61 02
C 14	33 uF 16 V	3422 87 67
C 23	10 uF 50 V	3422 86 19
C 30, 34	33 uF 16 V	3422 87 67
C 35	10 uF 16 V MIN	3422 85 30
C 37	0,47 uF 50 V	3422 61 02
C 40 - 43	10 uF 16 V MIN	3422 85 30
C 44	2,2 uF 50 V MIN	3422 85 09
C 55	10 uF 16 V MIN	3422 85 30
C 56	33 uF 16 V	3422 87 67
C 57	330 uF 25 V	3422 37 63
C 59	33 uF 10 V MIN	3422 85 37
C 60	100 uF 10 V	3422 23 84
C 61	10 uF 16 V MIN	3422 85 30
C 63	10 uF 63 V	3422 65 32
C 65	33 uF 16 V	3422 87 67
C 66	100 uF 10 V	3422 23 84
Spulen/Coils		
L 2		4543 18 48
L 3		4543 18 49
L 4, 6		4543 19 78
L 5		4543 19 79
L 8		4543 19 80
L 10		4543 19 81
L 11		4543 20 54

Filter/Filters

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
T 1		4552 94 37
T 2		4552 94 38
T 5		4543 99 64
CF 3		4552 90 64
SAW 1		4552 94 39

Allgemeine Bauteile/General Parts

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
X 1	Quarz Crystal Block	4421 24 30

0 5 Anzeige-Platte Display Board

Dioden/Diodes

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
D 1	RD 6,2 EB 2	3656 22 48

Elkos/Electrolytic Capacitors

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
C 1	33 uF 6,3 V MIN	3422 86 76
C 5	10 uF 50 V	3422 86 19

Filter/Filters

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
CF 1		4552 94 01

Schalter/Switches

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
S 17, 18		4112 95 34

Allgemeine Bauteile/General Parts

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
FDP 1	Display	3686 10 93
HD 1	Display-Halter Display Holder	8681 34 02

0 6 Anschlußbuchsen-Platte Terminal Circuit Board

Transistoren/Transitors

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Q 1	2 SB 643 RS	3614 47 05
Q 4	2 SB 810 H,J	3614 52 01
Q 10	2 SC 2021 RS	3614 47 18
Q 11	DTC 124 F	3614 48 57

Dioden/Diodes

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
D 1 - 13	1 SS 133	3656 22 30

Elkos/Electrolytic Capacitors

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
C 4	47 uF 10 V SMI	3422 86 39

Filter/Filters

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
LC 1, 2		4552 94 76

Allgemeine Bauteile/General Parts

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
	Buchsenplatte Connector Ass´y	4144 81 92
RY 1	Relais Relay	4124 10 95

0 7 Schalter-Platte Switch Circuit Board

Integrierte Schaltungen/Integrated Circuits

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
IC 301	TA 78 L 005 AP	3771 46 92

Transistoren/Transistors

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Q 301	2 SD 638 R	3614 36 56
Q 303	DTC 124 F	3614 48 57

Dioden/Diodes

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
D 1, 3	1 SS 133	3656 22 30
D 212	LED/SLR 34VC4	3681 16 70
D 213	LED/SLR 34MT4	3681 16 69
D 215	LED/SLR 34YC4	3681 16 87
D 301	11 E 2	3656 27 89

Trimmer-Widerstände/Trimmer Resistors

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
R 401	500 kOhm	3111 86 88
R 402	20 kOhm	3111 86 90
R 403	250 kOhm	3111 87 72
R 404	20 kOhm	3111 86 91
R 405	Schieberegler R,L Slide VR	3111 86 89

Tast-Schalter/Tact Switches

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
S 12-14		4112 95 34
S 15-217		4112 95 33
S 401		4112 96 18
S 402		4112 95 95
S 407		4112 96 19
S 409		4112 94 32
S 415, 416		4112 95 95
S 417		4112 96 18

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Filter/Filters		
LC 301, 302		4552 94 77
Allgemeine Bauteile/General Parts		
J 401	Kopfhörer-Buchse Head Phone Jack	4144 81 80
J 402	Mikrofon-Buchse Mic Jack	4144 81 79
0 8 Vorverstärker/MDA-Platte Pre Amp/MDA Circuit Board		
Kopftrommel MDA-Teil Drum MDA Section		
Integrierte Schaltungen/Integrated Circuits		
IC 1	AN 6671 K	3771 46 70
Transistoren/Transistors		
Q 1	2 SB 1052	3614 49 94
Dioden/Diodes		
D 1	RD5,1 ES-T1B	3656 29 15
Elkos/Electrolytic Capacitors		
C 4-7	2,2 uF 50 V	3422 61 53
Vorverstärker-Teil Pre amp Section		
Integrierte Schaltungen/Integrated Circuits		
IC 101	HA 11752	3771 46 79
Transistoren/Transistors		
Q 101- 103	2 SC 2021 RS	3614 47 18
Dioden/Diodes		
D 101	1 SS 133	3656 22 30
Elkos/Electrolytic Capacitors		
C 105	47 uF 6,3 V MIN	3422 85 59
C 113, 114	1 uF 50 V MIN	3422 86 94
C 116	2,2 uF 50 V	3422 87 44
C 121	47 uF 6,3 V MIN	3422 85 59
Spulen/Coils		
L 101		4543 95 85
L 102		4543 19 22
L 103		4543 95 85
0 9 VPS-Platte VPS Circuit Board		
VPS-Teil VPS Section		
Integrierte Schaltungen/Integrated Circuits		
IC 1	HD 49703 NT	3771 49 41
IC 2	M 7278 L 05	3771 47 74
Transistoren/Transistors		
Q 1	2 SB 641 R	3614 47 04
Q 2	2 SC 33 27 A	3614 52 13
Q 3	2 SD 637 R	3614 47 12
Dioden/Diodes		
D 1 - 5	1 SS 133	3656 22 30
Wid.-Netzwerke/Resistor Arrays		
RA 1		3722 25 99
Elkos/Electrolytic Capacitors		
C 1	33 uF 16 V	3422 87 67
C 3	10 uF 16 V MIN	3422 85 30
C 9 - 14	33 uF 16 V	3422 87 67
C 16	3,3 uF 50 V MIN	3422 85 48
C 17	10 uF 50 V	3422 86 19
C 18	10 uF 63 V	3422 65 32
C 21	33 uF 16 V	3422 87 67
Spulen/Coils		
T 1		4543 19 11
Speicher-Teil Remain Section		
Integrierte Schaltungen/Integrated Circuits		
IC 801	M 50740-616 SP	3771 50 99
IC 802	uPD 4013 BC	3771 47 02

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Dioden/Diodes		
D 801	RD 7,5 EB 2	3656 28 56
D 802	1 SS 133	3656 22 30
Wid.-Netzwerke/Resistor Arrays		
RA 801		3722 25 78
RA 802		3722 26 01
Elkos/Electrolytic Capacitors		
C 801	1 uF 50 V	3422 08 14
C 804	10 uF 35 V	3441 45 13
Spulen/Coils		
L 801		4543 99 46
Filter/Filters		
CF 801		4552 92 49
1 1 Power/IFR-Platte Power/IFR Circuit Board		
	Platte Circuit Board	6913 24 69
Dioden/Diodes		
D 201	LED/SLP 981 C-50	3681 16 68
Elkos/Electrolytic Capacitors		
C 203	1 uF 50 V	3422 08 14
C 204	2,2 uF 50 V MIN	3422 85 09
C 206	4,7 uF 10 V SMI	3422 86 39
Switches/Schalter		
S 201, 202		4112 95 34
Allgemeine Bauteile/General Parts		
HD 1	LED-Halter LED Holder	8681 37 14
1 2 Audio/Synchronkopf-Platte A/CTL Head Board		
	Platte unbestückt Circuit Board unfitted	6948 01 54

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
1 3 Bandende-Sensorplatte End Sensor Board		
Transistoren/Transistors		
Q 1	PT 352 VA	3614 49 17
1 4 Fädel/Steuer-Sensorplatte Loading/Mode Sensor Board		
PS 1	Photo-Sensor	3683 10 76
1 5 Cassetten LED-Platte Cassetten LED Circuit Board		
Dioden/Diodes		
D 1	GL 450	3681 16 41
1 6 Demodulator-Platte Demodulator Circuit Board		
Integrierte Schaltungen/Integrated Circuits		
IC 1	M 51365 SP	3771 48 76
IC 2	TDA 3800 GS	3763 14 49
Transistoren/Transistors		
Q 3	2 SC 3354 S,T	3614 52 45
Q 4	2 SC 3311 AR,S	3614 52 43
Q 5	2 SC 2655 Y	3614 36 47
Q 11 - 14	DTC 114 ES	3614 52 31
Q 15, 16	2 SD 1450 S,T	3614 55 05
Q 17, 18	2 SC 3311 AR,S	3614 52 43
Q 19	DTC 144 ES	3614 52 27
Dioden/Diodes		
D 2-6	1 SS 133	3656 22 30
Trimmer-Widerstände/Trimmer Resistors		
R 31	10 kOhm	3111 85 96
R 57, 62	3,3 kOhm	3111 86 50
Elkos/Electrolytic Capacitors		
C 16	10 uF 16 V MIN	3422 85 30
C 19	0,47 uF 50 V	3422 61 02
C 22, 26, 30	10 uF 16V MIN	3422 85 30
C 27	10 uF 50 V	3422 86 19

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
C 29	47 uF 16 V MIN	3422 85 42
C 32	0,47 uF 50 V	3422 61 02
C 41, 42	10 uF 16 V MIN	3422 85 30
C 43	47 uF 16 V MIN	3422 85 42
C 47	470 uF 16 V MIN	3421 08 86
C 49	1000 uF 16 V	3422 87 43
C 52, 53	10 uF 16 V MIN	3422 85 30
C 54	10 uF 50 V	3422 86 19
C 55 - 62	10 uF 16 V MIN	3422 85 30
C 63	33 uF 16 V	3422 87 67
C 64	47 uF 16 V MIN	3422 85 42
Spulen/Coils		
L 1		4543 20 55
L 2		4543 18 49
L 3-5		4543 20 56
L 9		4543 19 68
T 3		4543 20 57
T 4		4552 94 38
T 5		4543 20 58
T 6		4543 20 59
T 7, 8		4543 20 60
Filter/Filters		
CF 1		4552 90 22
CF 2		4552 90 89
CF 4		4552 91 13
CF 5		4552 91 14
SAW 1		4552 91 09
BPF 1		4552 93 66
Allgemeine Bauteile/General Parts		
CN4	Buchse Jack	4144 81 21

1 7 Hauptlöschkopf-Platte Full Erase Head Board

	Platte bestückt Circuit Board outfitted	6913 24 72

1 8 Cassettenschacht-Sensorplatte Cassette Housing Sensor Board

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Transistoren/Transistors		
Q 1	PT 352 VA	3614 49 17

2 0 Laufwerk-Anschlußplatte Deck Terminal Board

	Platte bestückt Board outfitted	6913 24 73
Transistoren/Transistors		
Q 1, 2	2 SD 636 Q	3614 36 78
Dioden/Diodes		
D 1, 2	1 SS 133	3656 22 30

2 1 Abwickelteller-Sensorplatte Supply Sensor Board

	Platte bestückt Board outfitted	6913 24 74
Dioden/Diodes		
D 4	HZS 5,6 EB 1	3656 29 27
Allgemeine Bauteile/General Parts		
PS 2	Photo Sensor	3686 10 80
HD 1	Sensor-Halter Sensor Holder	8681 34 03

2 2 Aufwickelteller-Sensorplatte Take up Sensor Board

Dioden/Diodes		
D 3	HZS 5,6 EB 1	3656 29 27
Allgemeine Bauteile/General Parts		
PS 1	Photo-Sensor	3686 10 80
HD 1	Sensor-Halter Sensor Holder	8681 38 05

3 1 Netzanschluß-Platte Outlet Board

A01	⚠ Netzbuchse AC Outlet	4134 70 12
PC 1	⚠ Netzkabel Power Cord	4147 04 92
F 4	⚠ Sicherung 2 AT Fuse 2 AT	4375 16 18

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
3 2	**Transformator-Platte Power Transformer Board**	
	Platte bestückt Board outfitted	6913 24 76
Filter/Filters		
LF 1		4552 94 78
LF 2		4552 94 36
Allgemeine Bauteile/General Parts		
F 1	⚠ Sicherung 0,8 AT Fuse 0,8 AT	4375 16 14
3 3	**Infrarot-Platte IFR board**	
Integrierte Schaltungen/Integrated Circuits		
IC 1	LA 7225	3771 46 83
Dioden/Diodes		
D 4	PD 49 PI	3656 29 72
Elkos/Electrolytic Capacitors		
C 5	47 uF 63 V MIN	3422 86 54
Spulen/Coils		
L 1		4543 18 50
3 4	**Netzteil (2)-Platte Regulator (2) Board**	
Transistoren/Transistors		
Q 7	2 SD 1785	3614 55 41
3 5	**Aufnahme/Vorverstärker-Platte Pre/Rec Circuit Board**	
Integrierte Schaltungen/Integrated Circuits		
IC 1	HA 11870 ANT	3771 49 40
Transistoren/Transistors		
Q 1	DTC 124 F	3614 48 57
Q 2	2 SC 2021 RS	3614 47 18
Q 4	2 SA 937	3614 84 92
Q 5 - 11	2 SC 2021 RS	3614 47 18
Q 12	DTC 124 F	3614 48 57
Q 14	2 SA 937	3614 84 92
Q 15	2 SC 2021 RS	3614 47 18
Dioden/Diodes		
D 1 - 6	1 SS 133	3656 22 30
Trimmer-Widerstände/Trimmer Resistors		
R 1, 2	2,2 kOhm	3111 85 94
R 40, 41	1,5 kOhm	3111 87 73
R 50	470 Ohm	3111 87 74
Elkos/Electrolytic Capacitors		
C 16	47 uF 63 V MIN	3422 86 54
C 23	0,1 uF 50 V MIN	3422 85 55
C 29	4,7 uF 6,3 V	3422 99 05
C 40	47 uF 6,3 V MIN	3422 85 59
Spulen/Coils		
L 1		4543 19 67
L 3		4543 19 69
L 4		4543 20 61
L 5		4543 19 65
L 6		4543 20 62
L 7		4543 19 65
L 8		4543 20 63
L 9		4543 96 35
L 10		4543 99 62
L 11		4543 95 25
L 12		4543 99 61
L 13		4543 95 25
L 14		4543 19 80
L 15		4543 20 61
L 16		4543 96 34
L 17		4543 95 25
L 18		4543 19 80
Filter/Filters		
EQ 1		4552 92 43
LPF 1		4552 93 96
LPF 2		4552 91 90

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Allgemeine Bauteile/General Parts		
TH 1	NTC/Thermistor	3171 91 86
3 6 Verbindungs-Platte Junction Board		
Integrierte Schaltungen/Integrated Circuits		
IC 1	M 47029 S	3771 49 47
Dioden/Diodes		
D 1 - 5	1 SS 133	3656 22 30
Wid.-Netzwerke/Resistor Arrays		
RA 1		3722 26 02
Filter/Filters		
CF 1		4552 90 67
3 7 Speicher-Platte Back Up Board		
	Platte bestückt Board outfitted	6913 24 80
M 6 IFR-Sender IFR Transmitter		
Integrierte Schaltungen/Integrated Circuits		
IC 1	MN 158452 ESD	3771 53 01
Transistoren/Transitors		
Q 1	2 SB 822 Q	3614 47 87
Q 2	2 SD 601 Q	3614 48 04
Q 3	UN 2214	3614 55 42
Dioden/Diodes		
D 1, 2	SE 303 AY	3681 17 02
D 3, 6	MA 151 WK	3656 27 27
D 5	MA 151 K	3656 28 67
Schalter/Switches		
S 46		4112 96 20
S 47		4112 96 21

Positions-Nr. Reference-No. Numéro de pos.	Gegenstand Description Description	Bestell-Nr. Part-No. No. de comm.
Allgemeine Bauteile/General Parts		
X 1	Quarz Crystal Block	4421 24 42
X 2	Quarz Crystal Block	4552 90 93
TML 1	Batt-Kontakt (+) Batt Contact (+)	8318 50 28
TML 2	Batt-Kontakt (-) Batt Contact (-)	8318 50 29

Mechanische Ersatzteile-Liste
Mechanical Spare Parts List

Videorecorder 3997 Hifi Oscar VPS
Telerecorder 4997 Hifi Oscar VPS

M 2 Gehäuse
Cabinet assembly

VR 3997

Positions-Nr. Reference-No. Numéro de position	Bestell-Nr. Part-No. Numéro de commande
P1, 41-63	6418 37 79
P 2	6318 35 40
P 4	4115 86 38
P 5	6134 47 74
P 6	6123 09 18
P 10	6134 48 15
P 11	6134 48 16
P 12	7358 25 14
P 13	7358 25 52
P 23	6913 24 59

Tastenkappen
Buttons

Positions-Nr. Reference-No. Numéro de position	Bestell-Nr. Part-No. Numéro de commande
P 41	◉ 6318 32 45
P 42	⏏ 6318 32 46
P 43	P△ 6318 32 47
P 44	P▽ 6318 32 48
P 45	◁◁ 6318 32 49
P 46	▶ 6318 32 50
P 47	▷▷ 6318 32 51
P 48	▮▶ ▶ ⏩ 6318 32 88
P 49	⏸ 6318 32 53
P 50	⏪ ◀ ◀▮ 6318 32 89
P 51	▭ 6318 32 90
P 52	■ 6318 32 52
P 53	● 6318 32 54
P 54	▶ 6318 32 55
P 55	⊖ 6318 32 91
P 56	M 6318 32 92
Feder für P 56 Spring for P 56	7358 23 10
Halter für P 56 Holder for P 56	8681 36 88
Tastatur-Folie Program Plate	8681 35 92
Klappe kpl. Door Ass´y	6134 48 17

Positions-Nr. Reference-No. Numéro de position	Bestell-Nr. Part-No. Numéro de commande
Führung Schiebe-Regler Slide Plate	8681 38 63

TR 4997

Positions-Nr. Reference-No. Numéro de position	Bestell-Nr. Part-No. Numéro de commande
P1, 41-63	6418 37 80
P 2	6318 35 40
P 4	4115 86 38
P 5	6134 47 75
P 6	6123 09 18
P 10	6134 48 20
P 11	6134 46 91
P 12	7358 25 14
P 13	7358 25 52
P 23	6913 24 59

Tastenkappen
Buttons

Positions-Nr. Reference-No. Numéro de position	Bestell-Nr. Part-No. Numéro de commande
P 41	◉ 6318 34 84
P 42	⏏ 6318 34 85
P 43	P△ 6318 32 59
P 44	P▽ 6318 32 60
P 45	◁◁ 6318 41 04
P 46	▶ 6318 41 05
P 47	▷▷ 6318 41 06
P 48	▮▶ ▶ ⏩ 6318 41 07
P 49	⏸ 6318 41 08
P 50	⏪ ◀ ◀▮ 6318 41 09
P 51	▭ 6318 41 10
P 52	■ 6318 41 11
P 53	● 6318 41 12
P 54	▶ 6318 41 13
P 55	⊖ 6318 41 14
P 56	M 6318 41 15
Feder für P 56 Spring for P 56	7358 23 10
Halter für P 56 Holder for P 56	8681 36 88
Tastatur-Folie Program Plate	8681 35 92
Klappe kpl. Door Ass´y	6134 48 21

Positions-Nr. Reference-No. Numéro de position	Bestell-Nr. Part-No. Numéro de commande
Führung Schiebe-Regler Slide Plate	8681 38 63

M 3 Chassis
Chassis Assembly

Positions-Nr. Reference-No. Numéro de position	Bestell-Nr. Part-No. Numéro de commande
P 21	4335 92 23
P 23, 24-28	4432 92 50
P 24	3178 10 06
P 26	4335 92 27
P 28	7338 20 23
P 33	8223 21 33
P 34	8223 21 34
P 35	8223 21 35
P 36	8318 48 56
P 37	8681 37 97
P 38	8681 38 67
P 57	4511 33 70
P 62	7358 23 77
P 68	8681 35 93
P 69	8318 50 19
P 70	8318 50 20
P 71	8318 50 21
P 77	8681 35 94
P 78	8681 35 95
P 79	7358 22 67
P 80	8681 38 69

M 4 Rec.-Chassis (1 + 2)
Mechanism Assy (1 + 2)

Positions-Nr. Reference-No. Numéro de position	Bestell-Nr. Part-No. Numéro de commande
P 2	8681 37 99
P 3	8681 38 09
P 5	8318 48 35
P 7+8	7525 10 34
P 8	7358 24 28
P 9+10	7525 10 35
P 10,11+12	7358 24 28
P 14	7525 10 45
P 16	7525 10 46
P 18	7525 10 17
P 19	7525 10 18
P 21, 22-27	7548 42 05
P 22	7358 24 36

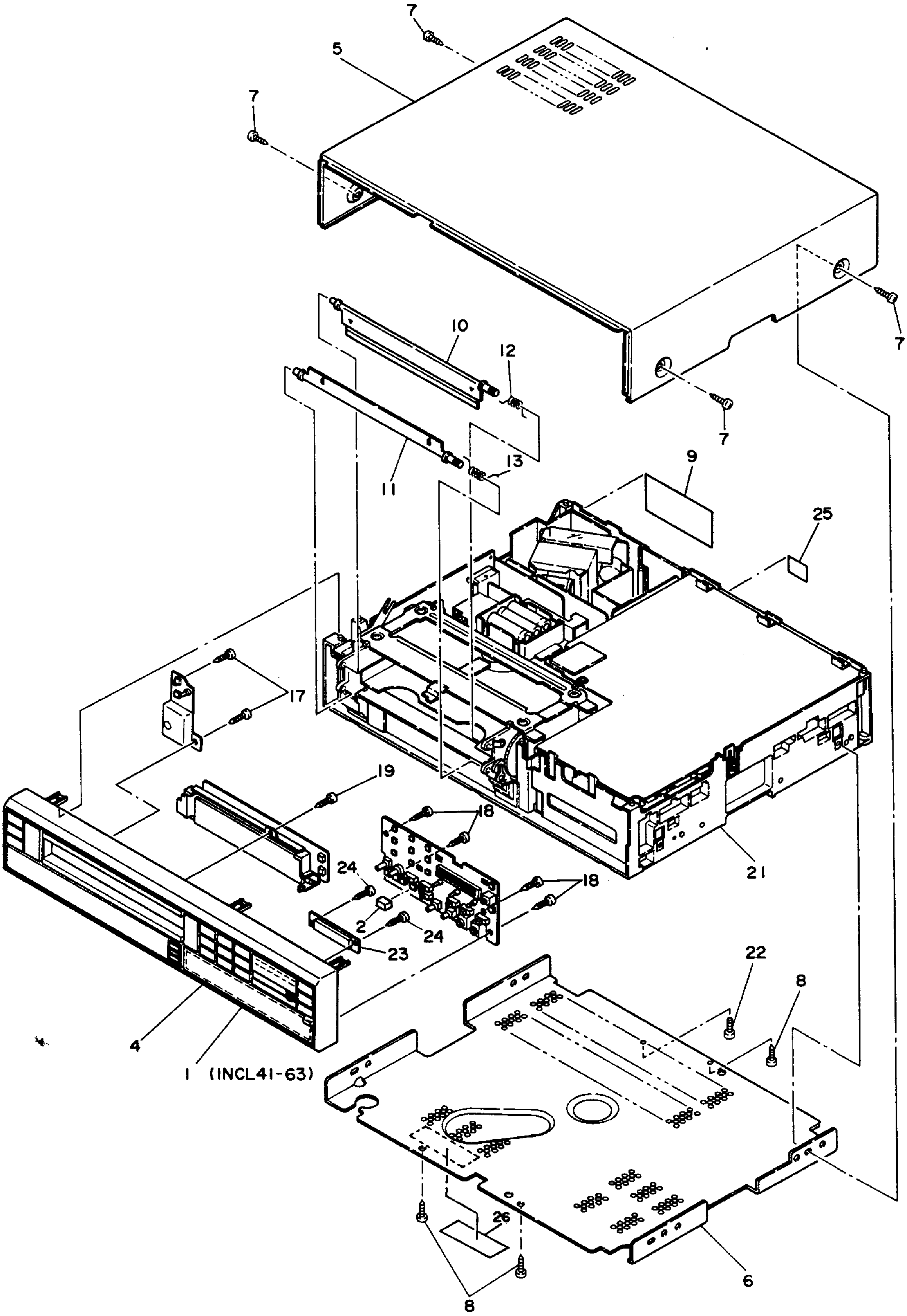
Positions-Nr. Reference-No. Numéro de position	Bestell-Nr. Part-No. Numéro de commande
P 23	7358 24 37
P 24	4432 91 95
P 27	7618 42 08
P 29	8318 45 84
P 32	8681 38 02
P 34	7538 33 45
P 37	8318 47 54
P 39	7358 23 39
P 40	8318 47 11
P 42, 43-45	8681 35 98
P 43	4337 91 39
P 45	7358 24 30
P 46	7358 24 31
P 47	8318 45 78
P 48	8318 50 22
P 50	8681 35 99
P 51	4335 92 52
P 52	7358 34 16
P 59	6568 11 66
P 60	8318 45 78
P 61	8681 35 48
P 63+64	8681 36 98
P 64	7358 24 39
P 66+67	8681 36 99
P 67	7358 24 40
P 69	8681 38 53
P 70	7358 24 42
P 72	6253 41 71
P 73	6253 41 72
P 76,77, 78	8681 37 05
P 77	7358 24 43
P 78	7358 24 44
P 80,81,82	8681 37 06
P 81	7358 24 43
P 82	7358 24 44
P 86	7358 24 45
P 87	8318 45 87
P 89, 90-95	6253 41 56
P 90	6253 41 57
P 91	6253 41 58
P 94	7358 24 46
P 95	7358 24 47
P 97, 98	8318 50 23
P 98	7358 23 40
P 100+ 101	8318 48 36
P 101	7358 22 68
P 103	8318 50 24
P 106	8318 50 25
P 109	4432 92 31
P 111	7618 42 07
P 112	7338 20 24
P 114	7358 24 49
P 126	7358 22 69

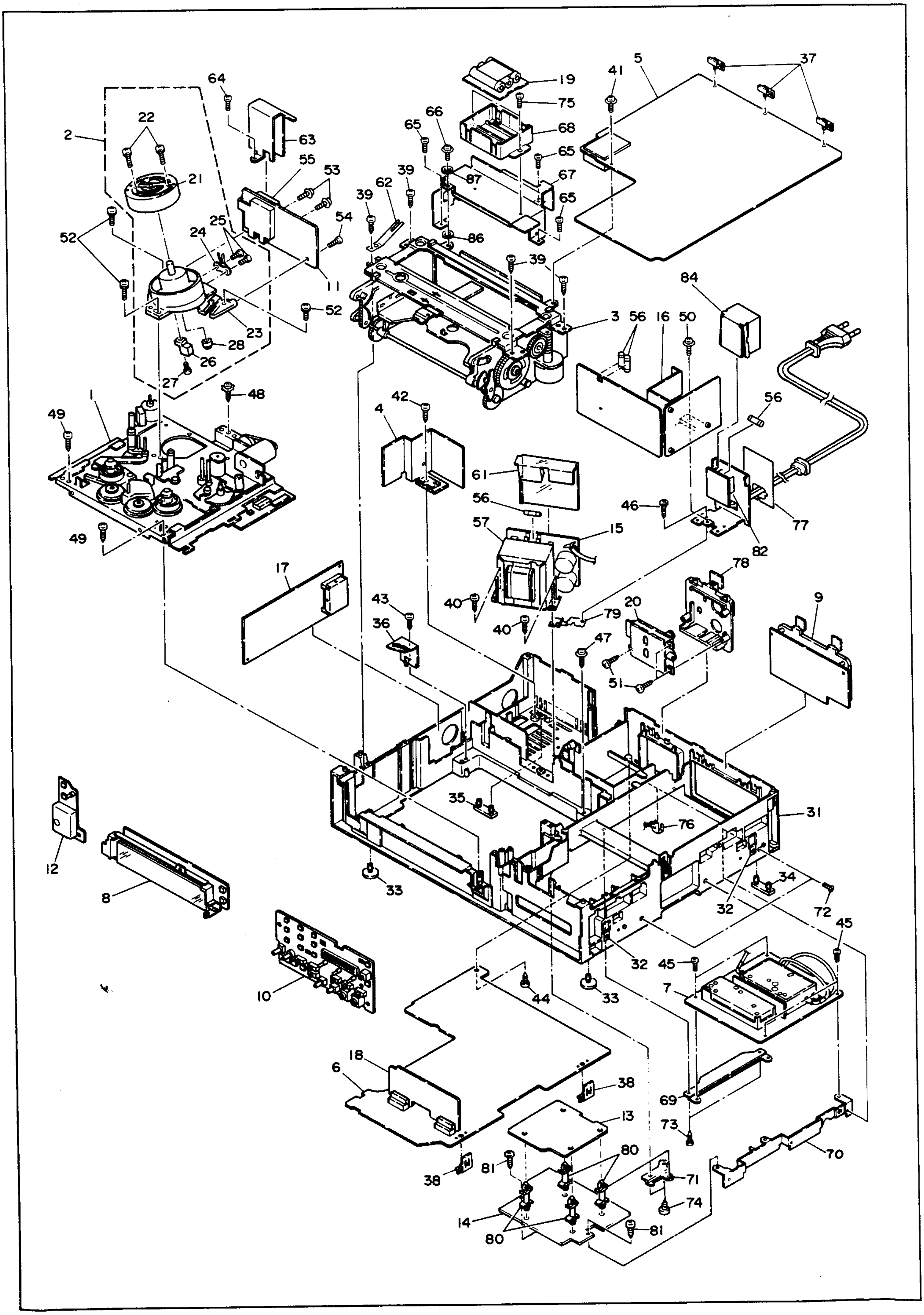
M 5 Cassettenschacht
Cassette Housing Assy

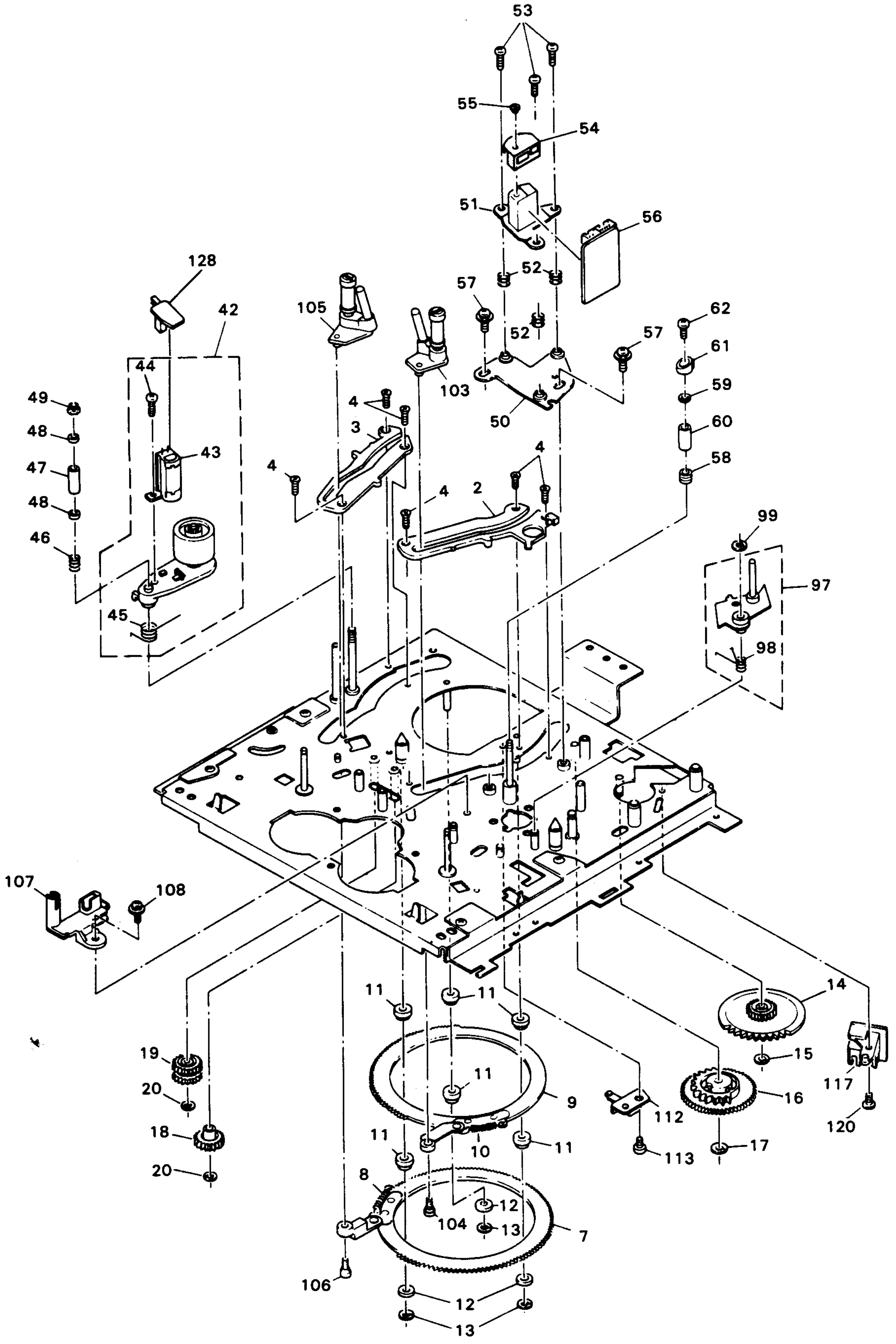
Positions-Nr. Reference-No. Numéro de position	Bestell-Nr. Part-No. Numéro de commande
P 3	7525 09 79
P 4	7525 09 80
P 6, 7	8681 38 20
P 7	7358 25 32
P 8	8681 24 36
P 9	7525 09 81
P 11	7525 09 82
P 12	7525 09 83
P 13	7525 10 51
P 14	7525 10 52
P 15	7358 25 33
P 16	7525 09 94
P 18	4432 91 70
P 19	4654 60 58
P 20	7525 09 87
P 23	8681 24 37
P 24	8681 24 38
P 25	8681 36 21
P 27	4112 94 31
P 28	4112 94 35
P 33	8681 23 06
P 35+36	8318 44 58
P 36	7358 23 74
P 37+38	8318 45 88
P 38	7358 23 74
P 44,45+46	8681 37 82
P 45	8211 46 13
P 46	7358 25 35
P 47, 48+49	8681 37 83
P 48	8211 46 13
P 49	7358 25 35
P 50	8681 24 40
P 51	8681 24 41
P 52	8681 38 52
P 53	7358 25 36
P 54	4112 94 55
P 55	4112 94 56
P 57	7538 33 30
P 60	8318 48 37
P 61	8318 47 10

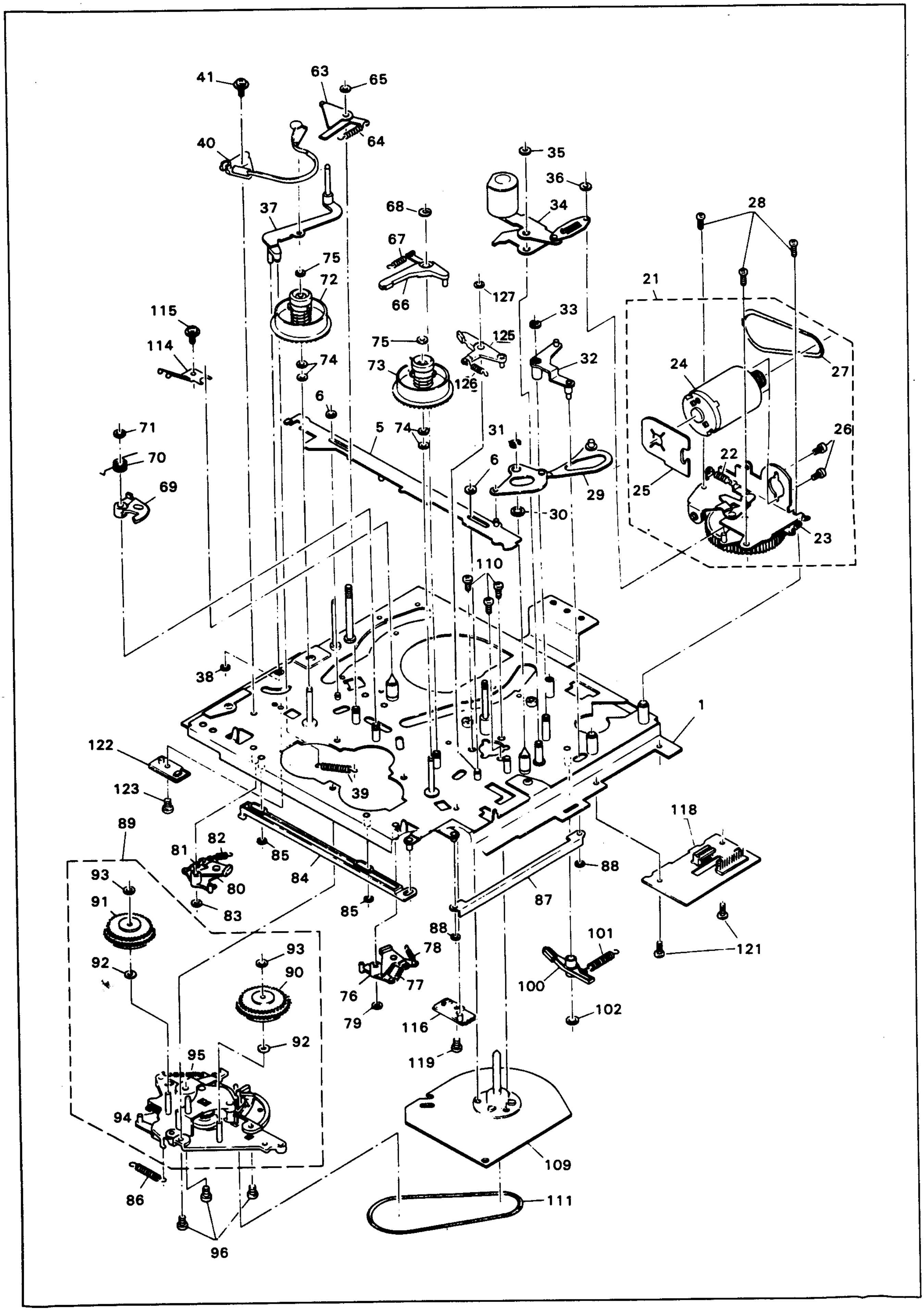
M 6 IFR-Sender
IFR Transmitter

Positions-Nr. Reference-No. Numéro de position	Bestell-Nr. Part-No. Numéro de commande
P 2	6135 49 02
P 3	6135 49 03
P 4	6135 49 04
P 5	6466 06 60
P 6	6466 06 61
P 7	8318 50 26
P 10	4188 04 54
P 11	4188 04 55
P 12	6466 06 62
P 13	6328 08 22
P 16	3686 10 97
P 17	8318 50 27
P 18	6318 32 93
P 19	6318 32 94
P 20	6318 32 95
P 21	6318 32 96
P 22	6318 32 97
P 23	6318 32 98

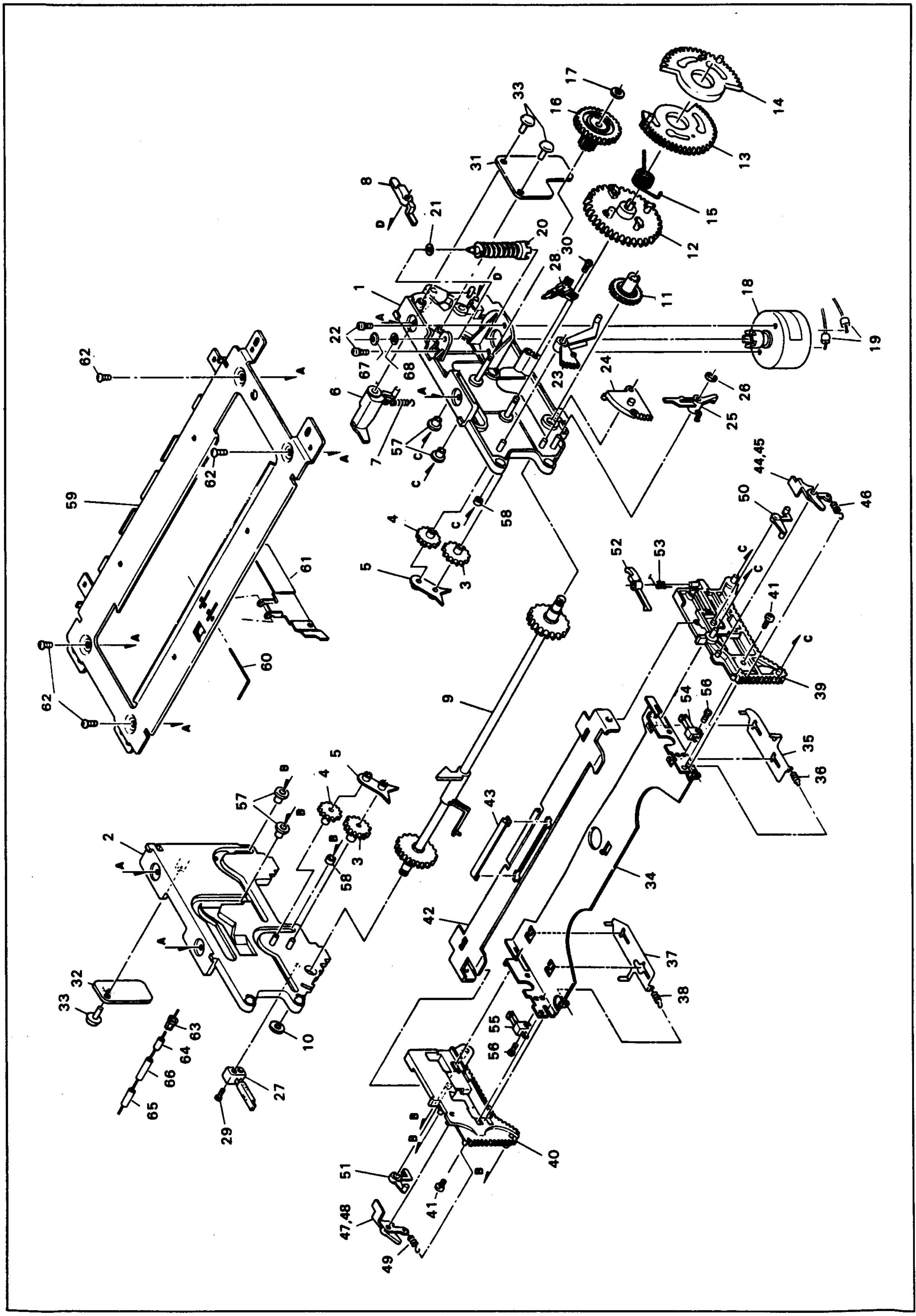

1 (INCL41-63)







Cassettenschacht
Cassette Housing Ass'y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68
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C
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44,45
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C
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C
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36
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5
B
57
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42
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47,48
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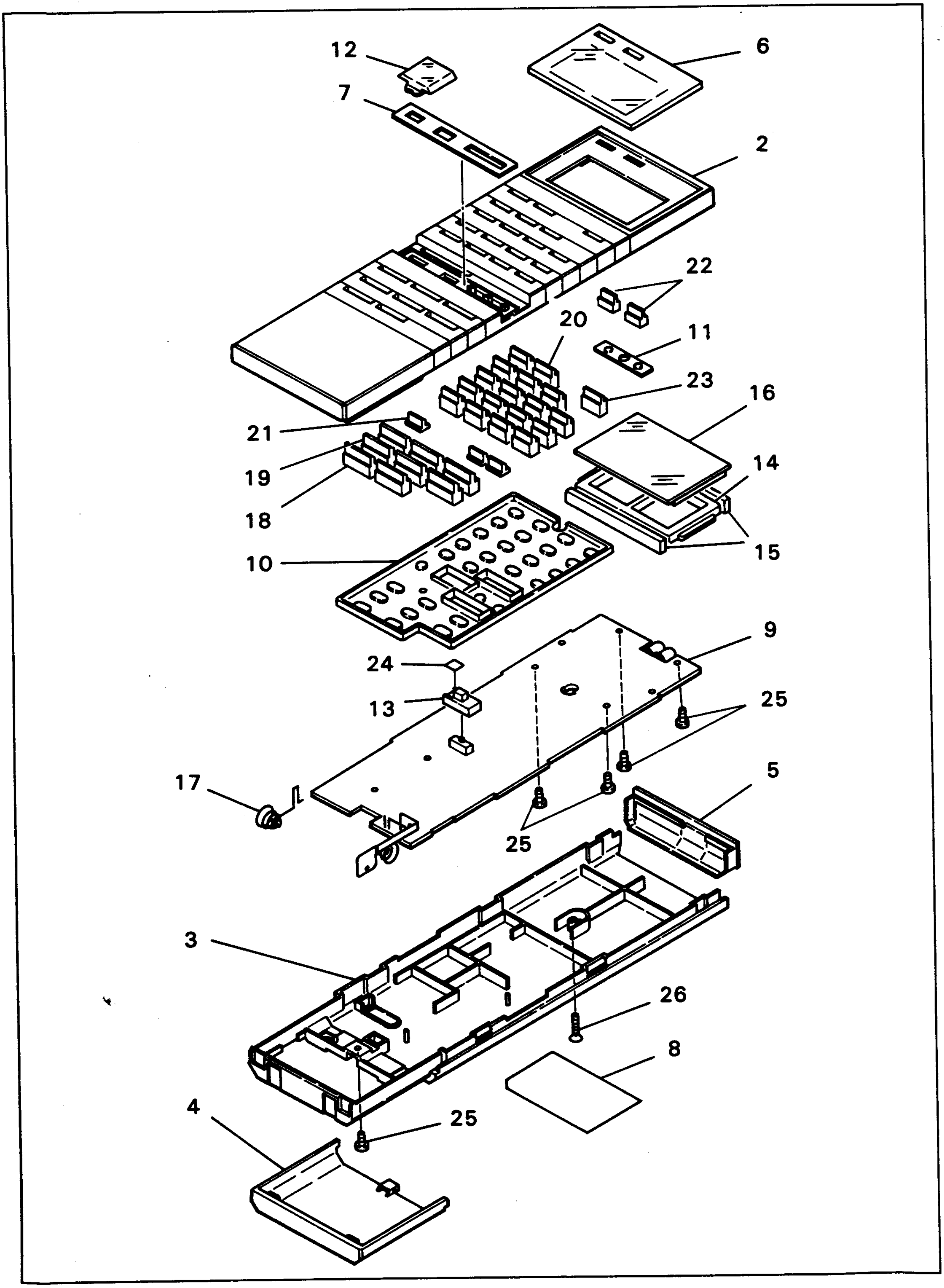
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